Monticello Mill Tailings Site Health and Safety Plan

Monticello Remedial Action Project (OU I) and Monticello Surface and Ground Water Remedial Action Project (OU III)

July 1993

Work performed under DOE Contract No. DE–AC04–86ID12584 for the U.S. Department of Energy
Grand Junction Projects Office

Chem-Nuclear Geotech, Inc.

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Health and Safety Plan

for

Monticello Remedial Action Project (OU I)

and

Monticello Surface and Ground Water
Remedial Action Project (OU III)

July 1993

Prepared by
Chem-Nuclear Geotech, Inc.
Under Contract No. DE-AC04-86ID12584
U.S. Department of Energy
Albuquerque Operations Office
Grand Junction Projects Office
Grand Junction, Colorado

Monticello Mill Tailings Site
Health and Safety Plan

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Acronyms

This list is supplied as an easy-reference guide to the acronyms used throughout this *Health and Safety Plan.*

AEC ..... Atomic Energy Commission
ALARA ..... As Low As Reasonably Achievable
APR ..... Air-Purifying Respirator
AS&R ..... American Smelting and Refining Company
BLM ..... Bureau of Land Management
CPR ..... Cardiopulmonary Resuscitation
DAC ..... Derived Air Concentration
DOE ..... U.S. Department of Energy
EMS ..... Emergency Medical Service
EPA ..... U.S. Environmental Protection Agency
FFA ..... Federal Facilities Agreement
FID ..... Flame Ionization Detector
GERT ..... General Employee Radiation Training
GJPO ..... Grand Junction Projects Office
HS&S ..... Health, Safety, and Security
HSP ..... Health and Safety Plan
HWI ..... Hazardous Waste Investigation
IARC ..... International Agency for Research on Cancer
ICRP ..... International Council on Radiation Protection
IDLH ..... Immediate Danger to Life and Health
IS ..... Industrial Safety
JSA ..... Job Safety Analysis
MED ..... Manhattan Engineer District
MRAP ..... Monticello Remedial Action Project
MSDS ..... Material Safety Data Sheet
MSGRAP ..... Monticello Surface and Ground Water Remedial Action Project
MVP ..... Monticello Vicinity Properties
NLC ..... National Lead Company
OH&S ..... Operational Health and Safety
OSHA ..... Occupational Safety and Health Administration
OU ..... Operable Unit
PCBs ..... Polychlorinated Biphenyls
PCN ..... Page Change Notice
PEL ..... Permissible Exposure Limit
PID ..... Photo Ionization Detector
PPE ..... Personal Protective Equipment
R&ES ..... Radiological and Environmental Safety
RI/FS ..... Remedial Investigation/Feasibility Study
RIP ..... Resin-In-Pulp
ROD ..... Record of Decision
RTA ..... Real Time Analysis
RWP ..... Radiation Work Permit
SFMP ..... Surplus Facilities Management Program
SHSC ..... Site Health and Safety Coordinator

SWP ..... Safety Work Permit
TCLP ..... Toxicity Characteristic Leachate Procedure
TLD ..... Thermoluminescent Dosimete
USTs ..... Underground Storage Tank
VCA ..... Vanadium Corporation of America
WBGT ..... Wet Bulb Globe Temperature

Preface

Because of changes in procedures and a desire to minimize confusion about the requirements to perform work on the millsite, the Health, Safety, and Security Subsection has revised the *Monticello Mill Tailings Site Health and Safety Plan.* All page changes submitted prior to August 1993 have been incorporated in this publication (Revision 1).

To ease the burden on personnel working under different projects, this document contains all health and safety plans (HSPs) that apply to the Monticello Mill Tailings Site. The following separately published HSPs are now obsolete:

- *Programmatic Health and Safety Plan* (P–GJPO–124, Rev. 2)
- *Surface and Groundwater RI/FS* (P–GJPO–753)
- *Health and Safety Plan for Remedial Action of Peripheral Properties* (P–GJPO–124.4)
- *1991 Characterization of Millsite Area Health and Safety Plan* (P–GJPO–124.3, Rev. 1)
- *Health and Safety Plan for Well Abandonment* (P–GJPO–124.5)

The appendices published with the *Monticello Mill Tailings Site Health and Safety Plan* define specific site tasks and requirements. All applicable Monticello millsite work plans must include these tasks and requirements. Additional requirements may be prescribed through approved RWPs or SWPs.

1.0 General Information

1.1 Background

The Monticello millsite is a 78-acre tract located along Montezuma Creek on the south side of the city of Monticello, San Juan County, Utah (Figures 1–1 and 1–2). In late 1940, the Vanadium Corporation of America (VCA) opened a vanadium ore-buying station at Monticello to stimulate vanadium mining in the region. Within a short time, ore production increased sufficiently to justify construction of a vanadium mill, and in September 1941, the War Production Board approved the proposal submitted by VCA for mill construction. Funding for construction was provided by the U.S. Government through the Defense Plant Corporation. The Metals Reserve Company assumed operation of the ore-buying station in April 1942 while the VCA operated the mill. The first vanadium was produced at the new mill on August 24, 1942.

In 1943, VCA began producing a uranium-vanadium sludge for the Manhattan Engineer District (MED), which had recently initiated a program to obtain domestic uranium. The mill closed in February 1944.

The VCA reopened the mill from 1945 to 1946 under lease from the Defense Plant Corporation and purchased stockpiled ore from the Metals Reserve Company. During this period, the VCA produced a uranium-vanadium sludge, which it sold to the MED.

The Atomic Energy Commission (AEC) bought the Monticello millsite from the War Assets Administration in 1948. The American Smelting and Refining Company (AS&R) acted as the ore-buying agent for the AEC, and the Galligher Company was engaged to design and operate a uranium mill at the site. In 1956, Lucius Pitkin, Inc., replaced AS&R as the ore-buying agent, and in April 1956, the National Lead Company (NLC) assumed operation of the mill. Shortly thereafter, the NLC also took over ore weighing, sampling, and stockpiling activities. Lucius Pitkin, Inc., continued to conduct administrative activities associated with ore purchase contracts, assaying, and settlements. The mill closed in January 1960, but the ore-buying station remained opened until March 31, 1962.

Tailings and other process-related contaminated material were generated as a result of the milling activities at the site between 1942 and 1960. The total volume of tailings, process-related contaminated material, and tailings-contaminated soil at the Monticello millsite is estimated to be 1,500,000 cubic yards.

1.2 Description of Milling Processes

VCA Salt Roast Process

During VCA operations at the Monticello mill, a salt roast process was used to convert vanadium mineral to soluble form. However, the high lime content of the carnotite ore processed at the mill presented metallurgic problems.

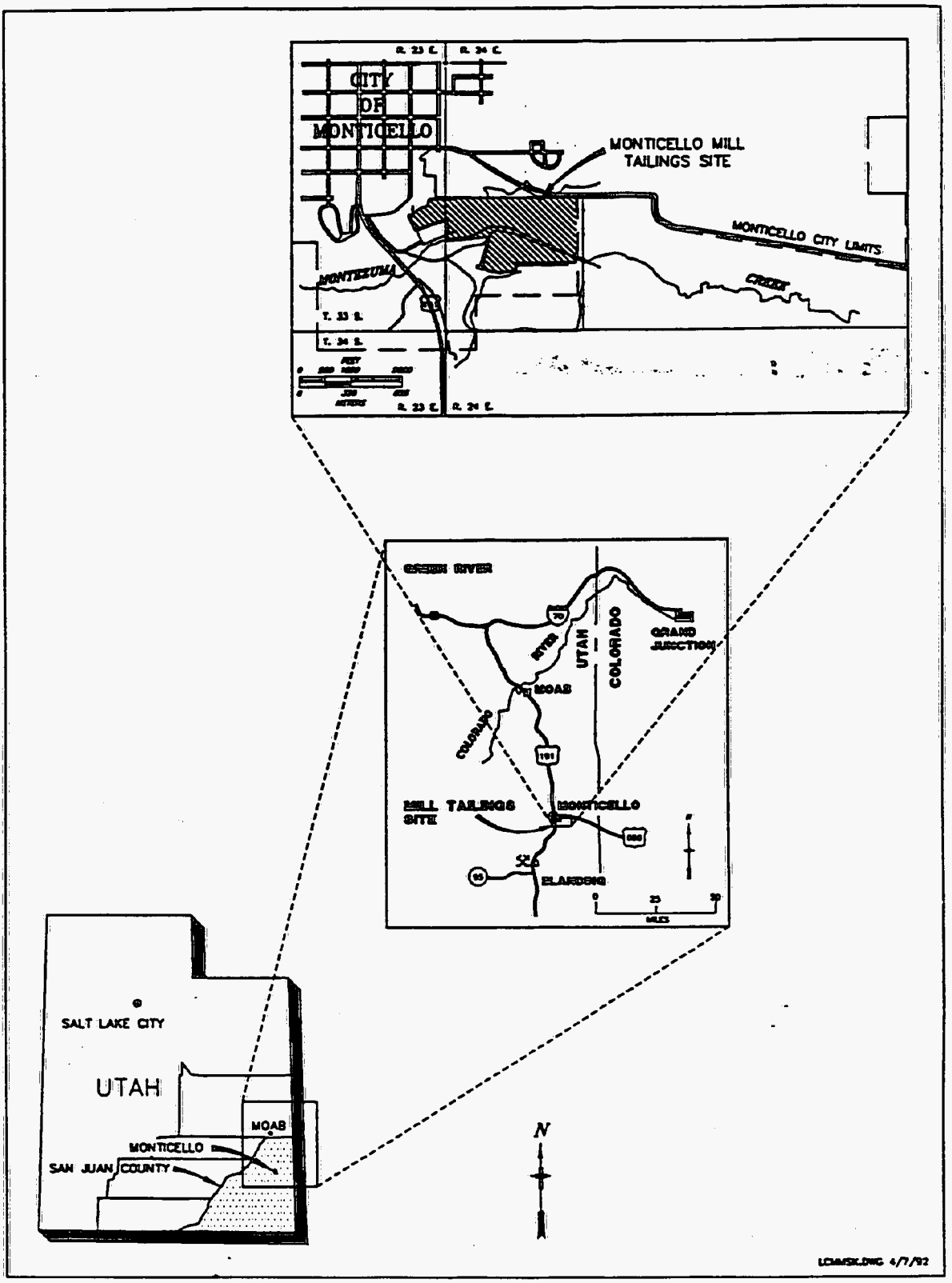

Figure 1–1. Monticello, Utah Regional Area Map

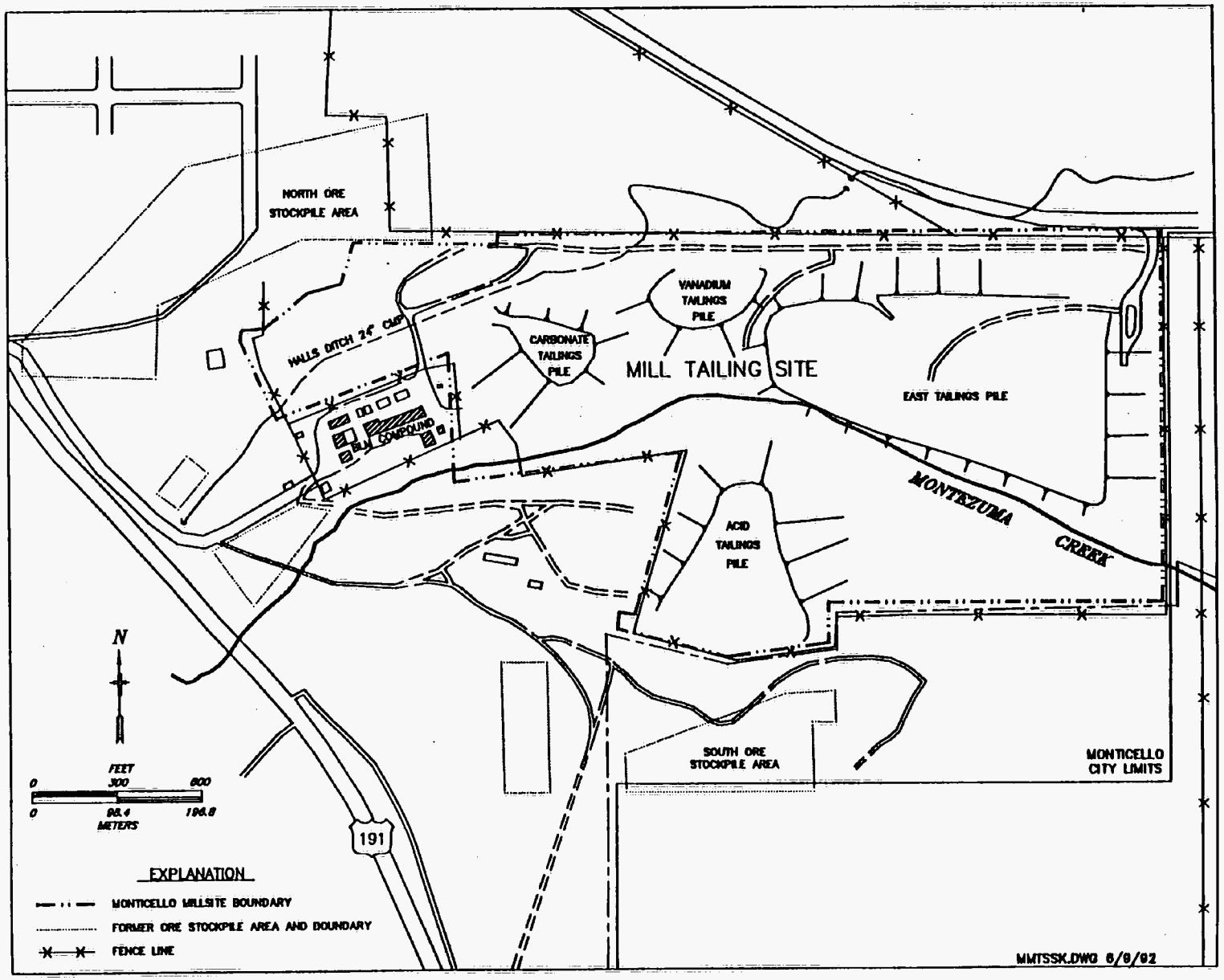

Figure 1-2. Location of the MRAP Millsite/Bureau of Land Management (BLM) Compound

The calcium carbonate caused excessive slagging, and the calcium liberated by roasting formed insoluble vanadium compounds. To counteract these problems, pyrite was added to cause some of the calcium to form calcium sulfate.

The hot ore was quenched in a solution of sodium carbonate, at which point most of the vanadium dissolved and calcium remaining as calcium chlorate precipitated as calcium carbonate.

After successive washing, the sands were transferred to tailings. Precipitation of vanadium pentoxide (V_2O_5) from the pregnant liquor was induced by the addition of sulfuric acid. The precipitate was washed to remove sodium chloride and sodium sulfate, and the wash water was discharged to the nearby creek.

AEC Processes

Ores received at the AEC ore-buying station and processed at the mill came from a wide geographic area and had a broad spectrum of metallurgic properties that affected the milling. As many as 27 different ore types were recognized among Colorado Plateau ores, which required a variety of milling processes.

Tests on the ores for process amenability were performed at the Monticello plant, the U.S. Bureau of Mines in Salt Lake City, and the AEC Pilot Plant in Grand Junction.

The milling processes used at Monticello during the 12 years of AEC operation included

- Up to 1955: Raw ore carbonate leach, low-temperature roast/hot carbonate leach, salt roast/hot carbonate leach.
- From 1955 to 1958: Acid leach resin-in-pulp (RIP), raw ore carbonate leach.
- From 1958 to closure in 1960: Carbonate pressure leach RIP.

1.3 Monticello Remedial Action Project

In 1978, the U.S. Department of Energy (DOE), under the authority of the Atomic Energy Act, initiated the Surplus Facilities Management Program (SFMP) to ensure the safe caretaking and decommissioning of Government facilities that were retired from service but were still radioactively contaminated.

In 1980, the millsite was accepted into the SFMP and the Monticello Remedial Action Project (MRAP) was established.

In 1983, the remedial activities at the vicinity properties were separated from MRAP with the establishment of the Monticello Vicinity Properties (MVP) Project.

1.4 Monticello Mill Tailings Site

The Superfund Amendments and Reauthorization Act of 1986 (SARA) placed the SFMP remedial activities at Monticello under the regulatory framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Monticello Mill Tailings Site was scored in accordance with CERCLA's hazardous ranking system and was subsequently placed onto the National Priorities List as a superfund site in November 1989.

The DOE entered into a Federal Facilities Agreement (FFA) with the U.S. Environmental Protection Agency (EPA) and the State of Utah in December 1988 to complete the remedial action at the Monticello sites. The *Monticello Mill Tailings Site Record of Decision* (ROD) was approved by all parties and signed September 1990. The ROD describes the selected remedial action for the Monticello millsite (Operable Unit [OU] I) and peripheral properties (OU II). Ground water and surface water (OU III) will be addressed in a separate ROD. When the ROD was signed, the DOE became obligated to commence continuous and substantive remediation 15 months from the date of signature. Implementation of the selected remedial action is addressed in the *MRAP Final Remedial Design Work Plan for the Monticello Mill Tailings Site* (P–GJPO–122).

In November 1990, the DOE reorganized to consolidate all its environmental restoration and waste management activities into a single office. The SFMP, including MRAP, was thereby incorporated into the newly created Office of Environmental Restoration and Waste Management, Southwest Programs, Off-Site Programs Division. The project is managed by the Grand Junction Projects Office (GJPO) through the DOE Albuquerque Field Office under the direction of the Assistant Manager for Energy and Special Programs.

1.5 Operable Units

Because of the complexity of the Monticello Mill Tailings Site, the DOE has divided the work into three manageable components called "operable units." Operable units are used to differentiate the types of properties or kinds of contaminated materials and to provide a means for developing and evaluating alternatives for remedial action for each operable unit.

Operable Unit I: Mill Tailings and Millsite Property

OU I includes the 78 acres of the millsite and the tailings impoundment areas, the tailings removed from the peripheral properties (OU II), and the tailings removed from the MVPs. The tailings piles are within the floodplain of Montezuma Creek. They are also partially in contact with a shallow alluvial aquifer underlying the site.

An estimated 100,000 cubic yards of contaminated material has been identified in the mill area and approximately 1.4 million cubic yards (2 million tons) of tailings, contaminated soil, by-product material, and contaminated building material is located in the tailings impoundment areas.

Operable Unit II: Peripheral Properties

Peripheral properties include DOE-owned and private land to the north and south of the existing site leased for the stockpiling of ore. The former ore-stockpile areas and areas contaminated by airborne tailings or surface-water transported materials cover approximately 300 acres around the site and contain most of the estimated 300,000 cubic yards of peripheral property material to be remediated. Peripheral properties also include the bed and banks of a 3.3-mile reach of Montezuma Creek extending from the millsite to the confluence of Montezuma and Vega Creeks. OU II requirements will be addressed in the OU II HSP.

Operable Unit III: Ground Water and Surface Water

In spring of 1991, OU III was elevated by DOE to project status with the creation of the Monticello Surface and Ground Water Remedial Action Project (MSGRAP).

OU III includes all ground water beneath the tailings piles extending approximately 2 miles downstream. At present, the alluvial aquifer is not used as a private or public drinking water source and is separated from the deeper Burro Canyon aquifer by Dakota Sandstone. The Burro Canyon aquifer, which is currently being used as a drinking water supply, has not been contaminated. An estimated 163 acre-feet of water is contaminated. An acre-foot is equivalent to 325,853 gallons.

OU III surface water consists of Montezuma Creek, which flows through the millsite. It is a small perennial stream that headwaters in the Abajo Mountains immediately west of Monticello.

The BLM, MP-181, and MP-211 properties will be included in this operable unit's Health and Safety Plan.

1.6 Site-Specific Health and Safety Plans for OU I and II

This HSP addresses the requirements contained in 29 CFR 1910.120, 29 CFR 1926, and all additional DOE health and safety requirements. The Geotech *Health and Safety Manual, Volume 1* (Manual 103), chapter 5, identifies the programmatic requirements to be adhered to throughout the Monticello Mill Tailings Site operations. Additional appendices to this HSP shall be created as needed to contain "phase-specific" requirements when different from those of the Monticello Mill Tailings Site. Any changes to this HSP shall be made in accord with the Geotech *Health and Safety Manual*, Volume 1, Procedure 5.1. Changes in the required personal protective equipment (PPE) for specific tasks can be made by the Project Manager after receiving written approval by the Monticello project safety officer.

1.7 Project Duration and Scope

The millsite work started in 1983 with the deposit of materials from the MVP Project and is scheduled to continue to approximately 2001. The work is conducted on a seasonal schedule, generally commencing in March or April and continuing through November or December. Outlines of the phase-specific tasks and the duration of those tasks appear in the appendices of this *Plan*.

1.8 Hazard Assessment Overview

Biological hazards expected at the millsite include exposure to insects, reptiles, small mammals, septic systems, and the Hantavirus.

Physical hazards expected at the millsite include temperature extremes, industrial noise, and heavy lifting operations.

Industrial safety hazards expected at the millsite include electrical hazards, heavy equipment, and trenching and other excavations.

Chemical hazards that may be encountered at the millsite include heavy metal contamination (from the mill tailings), volatile and semivolatile organic compounds, asbestos, polychlorinated biphenyls (PCBs), and pesticides and herbicides (in soils).

Radiological hazards expected at the millsite include the residual radioactive materials contained in the mill tailings.

Pre-entry monitoring (see section 7.2) has been conducted for respirable silica, metals, and airborne radioparticulates; to date none of the results has been above regulatory limits. If confined-space conditions develop, the requirements of Geotech *Health and Safety Manual*, Volume 1, Procedure 2.7, will be followed. Site activities may generate breathing zone concentrations of hazardous substances greater than permissible or published exposure limits. The combined use of engineering controls, safe work practices, and PPE should prove adequate to maintain worker exposure at or below the applicable limits and at as low as reasonably achievable (ALARA) levels.

2.0 Key Personnel Assignments

2.1 Geotech Program Personnel

The health and safety duties and responsibilities of the following personnel are covered in the Geotech *Health and Safety Manual*, Volumes 1 and 2, the Geotech *Operations Management Policies Manual* (Manual 104, the Geotech *Health, Safety, and Security Desktop Procedures Manual* (Manual 303), and the Geotech *Construction Procedures Manual.*

Table 2–1 identifies the program management personnel who provide support for the remedial action tasks addressed in this HSP.

Figure 2–1 identifies the Monticello millsite field organizational matrix.

Table 2–1. Chem-Nuclear Geotech Personnel in Support of MMTS

Position	Name	Phone
Denver/Utah Operations:		
Director	Michael E. Madson	303-248-6026
Monticello Programs:		
Manager	Harry A. Perry	303-248-6018
Monticello Site:		
Construction Manager	John G. Pepin	303-248-6482
Project Manager	Thomas G. Myer	801-587-2615
Field Assessments:		
Manager	Richard L. Murri	303-248-6024
Manager, Field Services	Kenneth R. Ivie	303-248-6337
Verification Supervisor	Robert B. Hopping	303-248-6742
Manager, HWI&R	Donald E. White	303-248-6432
HWI Supervisor	Charles E. Poland	303-248-6661
Health, Safety and Security:		
Manager (Acting)	Michael D. Sandvig	303-248-6712
Manager, OMP	M. Tim O'Malley	303-248-6713
Project Safety Officer	W. Dave Allen	801-587-2615
Manager, R&ES	Michael D. Sandvig	303-248-6712
Radiological Control	Jeff Burnett	303-248-7706
R&ES Industrial Hygienist	Mark S. Wilson	303-248-6725
OH&S Supervisor	Daryl R. Hillyer	801-587-2615

2.2 Geotech On-Site Personnel

On-site personnel will be identified in the phase-specific appendices of this document. The identification shall include the name, title or position, telephone extension, and responsibilities of each position.

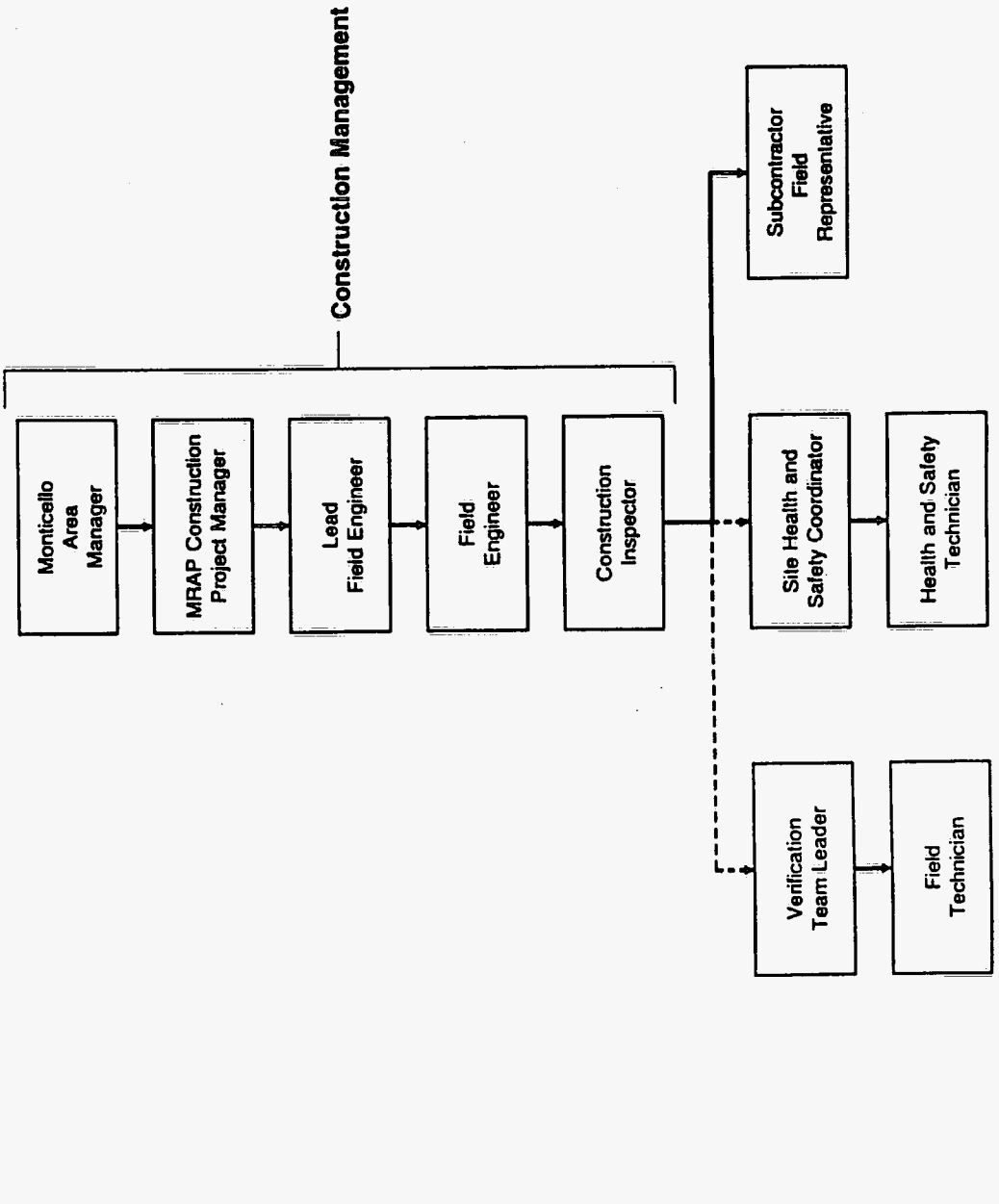

Figure 2–1. Monticello Millsite Field Organization Chart

3.0 Safety and Health Hazard Analysis

3.1 Purpose of the Hazard Analysis

All chemical and physical agents can produce adverse health effects at some dose or under specific exposure conditions (concentration plus duration). A risk is the *probability* or likelihood that an adverse effect will occur in a person or group exposed to a particular concentration or dose of hazardous substance. A hazard is the *source* of the adverse effect. An example of this concept is:

> Benzene is an exposure *hazard* because benzene is the source of a particular type of adverse effect—leukemia. Once exposure occurs, the *risk* of developing leukemia is dependent on the concentration and duration of exposure.

In short, a risk is the probability of loss or injury from a danger, and a hazard is the source of the danger.

The safety and health hazard analysis evaluates the identified site safety and health hazards on the basis of available data. The hazard analysis subjectively rates the magnitude of the hazards, or potential hazards, so that the appropriate control measures can be implemented to maintain the exposures at ALARA levels. The hazard analysis also establishes exposure monitoring requirements. Monitoring information and subsequent site activities will change the safety and health hazards to which control measures are adjusted accordingly.

This section contains the hazards identified for appendices C through F. In the future, any phase-specific tasks to be completed under this HSP must have a hazard analysis completed in accord with Procedure 5.2 of the Geotech *Health and Safety Manual*, Volume 1. The hazard analysis must be completed prior to the implementation of any new task-specific appendices.

3.2 Phase-Specific Task Identification

For each phase, site tasks must be identified and put into a table format. These phase-specific tasks must be included in the appendix designated for that task. To estimate the level of hazard potential faced by Geotech employees, these tasks are considered during evaluation of the potential for exposure to hazardous substances. The health and safety requirements contained in this HSP are keyed to the periods during performance of these tasks. The hazard analysis will be maintained in the phase-specific appendix until the completion of that phase; then it shall be deleted.

3.3 Chemical Hazard Identification

Chemical Contaminant Hazards on the Millsite

The chemical contaminant hazard source is the heavy metals typically found with uranium-bearing ores. A wide range of heavy metals are found in the uranium-bearing ores brought to the mill. The milling process was not designed to remove these metals; consequently, they passed through the process at the same concentrations as or higher concentrations than the source material. Sampling

performed during the characterization of the mill contained in the *Final Remedial Investigation/Feasibility Study— Environmental Assessment for Monticello, Utah, Uranium Mill Tailings Site, January 1990* (DOE/EA 0424) (Monticello RI/FS) has identified heavy metal contaminants in the tailings piles at the millsite. It is important to note that these metals are not present in their elemental state. Table 3–1 provides a summary of concentration mean values for the metals sampling on the tailings piles at the millsite. The signs and symptoms of exposure to these metals are listed below:

Antimony **Permissible Exposure Limit = 0.50 mg/m^3**

Antimony is not provided with a "skin" designation by OSHA but is considered a primary skin irritant. Lesions may appear on exposed moist areas of the body but rarely on the face. The dust may also irritate the eyes, nose, and throat and may be associated with gingivitis, anemia, and ulceration of the larynx. Symptoms of exposure include irritated eyes, nose, and throat, and coughing.

Arsenic **Permissible Exposure Limit = 0.01 mg/m^3**

Arsenic is considered carcinogenic to humans by the International Agency for Research on Cancer (IARC) and is a OSHA-regulated carcinogen. Arsenic is a skin irritant and may cause dermatitis. Some arsenic compounds, after prolonged contact, are corrosive to the skin. Acute toxic effects of arsenic from inhalation are exceedingly rare. The effects of arsenic are generally seen following ingestion; however, this effect also rarely occurs in the occupational setting. Symptoms of ingestion are constricting of the throat, stomach pains, vomiting, and diarrhea.

Beryllium **Permissible Exposure Limit = 0.002 mg/m^3**

Beryllium is considered probably carcinogenic to humans by the IARC. Beryllium is a highly toxic substance. Entrance to the body is almost entirely through inhalation. Effects of exposure primarily involve the respiratory tract such as a nonproductive cough, substernal pain, moderate shortness of breath, and some weight loss. Long term exposure to beryllium can cause "chronic beryllium disease," which frequently has a latency period from 5 to 10 years.

Cadmium **Permissible Exposure Limit = 0.20 mg/m^3**

Cadmium is considered probably carcinogenic to humans by the IARC. Cadmium is a respiratory tract irritant. Prolonged exposure can cause olfactory fatigue and a yellow stain that gradually appears on the necks of the teeth. Acute toxic effects of cadmium are almost always caused by inhalation of dusts or fumes when the cadmium is heated. Symptoms include irritation of the upper respiratory tract, coughing, pain in the chest, and sweating.

Chromium **Published Exposure Limit = 0.005 mg/m^3**

Hexavalent chromium is considered carcinogenic to humans by the IARC. In some workers, chromium acts as an allergen that causes dermatitis to exposed skin. Most cases of toxic effects to exposure to chromium occur in the electroplating industry and during the manufacturing process.

Copper **Published Exposure Limit = 1.00 mg/m³**

Copper salts act as a skin irritant causing itching, redness of the skin, and dermatitis.

Lead **Permissible Exposure Limit = 0.05 mg/m³**

Exposure to lead can be from inhalation of dusts or from skin exposure. Symptoms are nonspecific and can be hard to distinguish from minor seasonal illnesses. The symptoms are decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, digestive disorders (particularly constipation), abdominal pains, and decreased appetite.

Mercury **Permissible Exposure Limit = 0.10 mg/m³ (Ceiling)**

Mercury is a primary irritant of the skin and mucous membranes and may also be a sensitizer. Symptoms of exposure include weakness, loss of appetite, weight loss, insomnia, indigestion, coughing, and chest pains.

Molybdenum **Permissible Exposure Limit = 5.00 mg/m³**

Molybdenum exposure can cause irritation of the eyes and mucous membranes of the nose and throat.

Nickel	**(solubile)**	**Permissible Exposure Limit = 0.1 mg/m³**
	(insolubile)	**Permissible Exposure Limit = 1.0 mg/m³**

Nickel is considered carcinogenic to humans by the IARC. Skin sensitization is the most common form of toxic reaction to nickel. Inhalation of nickel dust produces an increased incidence of lung and nasal cancer. The latency period of theses cancers is about 25 years.

Selenium **Permissible Exposure Limit = 0.20 mg/m³**

The first and most characteristic sign of selenium exposure is a garlic odor of the breath. More subtle and an earlier sign of exposure is a metallic taste in the mouth; other symptoms include lassitude, irritability, indigestion, and giddiness.

Silver **Permissible Exposure Limit = 0.01 mg/m³**

Symptoms of exposure to silver are argyria, or a permanent pigmentation of the skin.

Thallium **Permissible Exposure Limit = 0.10 mg/m³ (Skin Designation)**

Thallium is a skin irritant and a sensitizer, but these symptoms rarely occur in the occupational environment. Thallium is extremely toxic and a cumulative poison. Early symptoms of exposure include fatigue, limb pain, metallic taste in the mouth, and hair loss.

Uranium	**(solubile)**	**Permissible Exposure Limit = 0.05 mg/m³**
	(insolubile)	**Permissible Exposure Limit = 0.2 mg/m³**

The major effects of uranium come from its radiological properties. Uranium is deposited in the kidneys and in bone without significant adverse effects.

Vanadium **Permissible Exposure Limit = 0.05 mg/m³**

Vanadium compounds, especially vanadium pentoxide, are irritants to the eyes and skin. Symptoms of exposure include watering and burning eyes, a green discoloration of the tongue, and a metallic taste in the mouth. Inhalation of vanadium pentoxide can cause an irritation of the respiratory tract, serious or hemorrhagic rhinitis, sore throat, cough, bronchitis, and expectoration. Chest pain may result after even brief exposure. More serious exposure can result in pulmonary edema and pneumonia, which may be fatal.

Zinc **Permissible Exposure Limit = 5.00 mg/m³**

Under poor hygiene conditions, dermal exposure to zinc can cause a specific dermatitis. Toxic effects of inhalation are not experienced outside the manufacturing environment.

Table 3–1. Summary of Mean Values For Tailings Data From Monticello RI/FS, 1990.

Element	Mean Concentration (ppm)					
	Carbonate Pile	Vanadium Pile	East Pile	Acid Pile	All Piles	Sandstone Abundance*
Antimony	<1.8	<1.0	<1.0	<1.0	<1.0	0.5
Arsenic	89	52	70	72	71	6.5
Beryllium	<1.4	1.5	<2.0	2.0	1.8	<4
Cadmium	<3.1	3.2	<3.5	2.6	3.0	—
Chromium	52	58	47	33	47	27
Copper	634	590	1,964	1,656	1,134	19
Lead	74	73	107	78	83	14
Mercury	<.06	<.08	<.07	<.10	<.06	.05
Molybdenum	22	17	45	43	32	—
Nickel	31	25	41	42	35	24
Selenium	<1.0	<1.0	<1.0	<2.8	<1.0	—
Silver	<2	<2	<2	<2	<2	.24
Thallium	<2	<2	<2	<2	<2	1
Vanadium	3,806	4,264	585	1,143	2,256	64
Zinc	206	169	221	164	190	57

* Abundance concentrations are determined from sandstone data listed in the *Handbook of Geochemistry.*

Other Chemical Hazards on the Millsite

Asbestos **Permissible Exposure Limit = 0.2 f/cc**

Asbestos could have been used as insulation in buildings, on piping, vessels, and tanks, as a floor covering VAT,and in gaskets and packing; it may also have been disposed of on site.

Asbestos is a confirmed human carcinogen. It can produce serious lung damage and diseases including asbestosis, a diffuse but nonumiform fibrosis of the lung, and lung cancer. It can also cause

mesotheliomas, a rare but usually rapidly fatal cancer of the surface lining of the chest or abdominal cavity.

Calcium Carbonate **Permissible Exposure Limit = 15 mg/m³**

Calcium Carbonate was a byproduct of the VCA Salt Roast Process. Calcium Carbonate is a nuisance dust that may cause physical irritation.

Carbon Monoxide **Permissible Exposure Limit = 35 ppm**

Carbon monoxide levels can exceed the action level during heavy equipment operations and internal combustion operations in confined areas or outdoor areas shielded from the wind.

Carbon monoxide is a colorless and odorless gas that is a chemical asphyxiant. Carbon monoxide can prevent the body from getting enough oxygen to sustain life.

Silica Quartz **Permissible Exposure Limit = 0.1 mg/m³**

The soil in eastern Utah has naturally occurring high concentrations of silica quartz. Silica quartz can produce silicosis, a chronic disease characterized by formation of scar tissue in the lungs. Silicosis is a serious lung disease that can lead to disability and death even without continued exposure.

Sulfuric Acid **Permissible Exposure Limit = 1.0 mg/m³**

Sulfuric Acid was used in the VCA Salt Roast Process. Sulfuric acid is corrosive and can cause severe damage to skin, eyes, and lungs.

Volatile, Non-Volatile, and Semi-Volatile Organic Compounds

The following organic compounds may be on the site because of the abandoned laboratory, boiler fuel storage tanks, underground storage tanks, drums and other containers, acid storage tanks, septic systems, and suspected landfill or dumping grounds that may have been located on the BLM , MP-00105, MP-00181, MP-00211, MP-00391, and MP-00887 properties.

Acids

Various unknown acids (nitric, hydrofluoric, hydrochloric, perchloric, sulfuric, and phosphoric) that could be corrosive and cause damage to eyes, skin, and lungs.

Petroleum Products—Fuels

Petroleum products can cause dry skin, irritation, anesthetic effects, loss of coordination, depress the central nervous system, and death. Fuels have been associated with skin, and kidney cancer.

Chlorodiphenyls—PCBs **Permissible Exposure Limit = 0.5 mg/m³**

PCBs may cause acne, irritation of respiratory passages, injury to the liver, and cancer.

3.4 Biological Hazard Identification

No historical data indicate that any biohazard associated with medical wastes is a concern at the project site. Anticipated biological hazards include insects, spiders, snakes, and small mammals. Small mammals may provide a potential for spreading infectious diseases such as rabies. Rodents and their nests, droppings, urine, and food may carry the Hantavirus, which is thought to be the cause of Adult Respiratory Distress Syndrome, a fatal disease.

3.5 Radiological Hazard Identification

Residual radioactive material cleanup is the focus of MRAP. The waste resulting from uranium milling operations (mill tailings) contain several isotopes of concern. Table 3–2 lists these isotopes along with the decay mode and derived air concentration (DAC) limits. The Manager, Operational Health and Safety (OH&S), shall authorize the use of a default DAC only after calculation approval by the Radiological Controls Manager.

Table 3–2. Typical Radioisotope Contamination

Element or Isotope	Decay Type	Derived Air Concentration[a]
Uranium-238	α,β,γ	$6X10^{-10}$ µCi·mL^{-1} (22 Bqm^{-3})
Radium-226	α,β,γ	$3x10^{-10}$ µCi·mL^{-1} (11.1 Bq·m^{-3})
Thorium-230	α,β	$7x10^{-12}$ µCi·mL^{-1} (25mBq·m^{-3})
Radon-222	α,β,γ	$3x10^{-8}$ µCi·mL^{-1}[b] (1110 Bq·m^{-3})
Default DAC Mixture	α,β,γ	$2.OE^{-11}$ µCi·mL^{-1} (740 mBgm^{-3}) (10/92)

[a] Derived air concentration listed in DOE Order 5480.11.

[b] These values are appropriate for protection from radon combined with its short-lived daughters and are based upon International Council on Radiation Protection (ICRP) Publication 32 (EPA 520/1–88–020).

3.6 Safety Hazard Identification

Heavy Equipment Operations

Haul trucks, cranes, bulldozers, front-end loaders, drill rigs, and backhoes are some of the heavy equipment that may be present at the site clean-up, as wells as compressors, generators, and miscellaneous other items.

Belts, pulleys, sheaves, gears, chains, shafts, clutches, drums, flywheels, and other reciprocating or rotating equipment parts pose potential nip or pinch points.

High temperature lines and related equipment may pose a danger to employees or create a fire hazard.

Refueling gasoline-operated equipment may involve fire hazards.

Working under equipment may constitute a severe crushing hazard.

Noise

Work around equipment often involves loud noise.

Heat Stress

Personnel wearing protective clothing while working in warm temperatures are subject to heat-induced physiological stress. Heat stress is a progressive illness that ranges in effect from a skin rash to death.

Cold Stress

Personnel may be subjected to low temperature extremes along with windy conditions. Cold stress can be manifested as both hypothermia and frostbite.

Electrical Hazards

Overhead power lines, downed electrical wires, buried cables, capacitors, transformers, batteries, and other high-voltage sources all pose a danger of shock or electrocution if workers contact or sever them during site operations. Electrical equipment used on-site may also pose a hazard to workers.

Materials Handling

Materials handling at site cleanups can vary from heavy equipment handling to manual handling of drums, equipment, and other cleanup items. Moving heavy containers by hand and working around stacked drums, heavy equipment and deteriorated drums may result in physical injury caused by detonation, fire, explosion, or vapor generation.

Manual Lifting

Lifting heavy loads is potentially hazardous, because it can cause injuries to the back and abdominal muscles. Such injuries can range from relatively mild strains to permanent disabling.

Trips and Falls

During all phases of cleanup activity, rocky, uneven, often wet terrains can result in slipping, tripping or falling. The risk of such accidents at cleanup sites is significant.

4.0 Personal Protective Equipment

4.1 PPE Assignment by Contractor Oversight Tasks

Detailed PPE assignments shall be categorized by each Geotech contractor oversight task. These assignments shall be made after an evaluation of existing information. Should the Site Health and Safety Coordinator (SHSC) identify site conditions that vary from those evaluated (Section 3.0), additional PPE may be required. Any additional PPE may be prescribed by an approved radiation work permit (RWP) or safe work permit (SWP) specifying hazards for the work area involved.

PPE levels assigned by task must be assigned and maintained in the phase-specific appendices of this HSP PPE levels for radiological protection must be controlled by the RWP.

Selection of respiratory protection shall be made by using respirator selection checklists, Geotech *Health and Safety Manual*, Procedure 4.1, in conjunction with this HSP or the applicable RWP or SWP.

4.2 Action Levels

The action levels detailed in Table 4–1 must be used during the site activities to ensure that any hazards present at the project site are properly evaluated and correct action is taken to protect the workers.

Table 4–1. Actions Required for Specific Exposure Monitoring Results

Parameter	Action Level	Action Required
Radiation Dose Rate	>2 mrem/h (20 μSv/hr) at 1 ft (30 cm) from source	Follow Geotech *Health and Safety Manual*, Volumes 1 and 2; also, Geotech *Health, Safety, and Security Desktop Procedures Manual* for posting RWP and TLD requirements
Surface Contamination	Refer to Geotech *Health and Safety Manual, Volume 2*	Follow Geotech *Health and Safety Manual*, Volumes 1 and 2; also Geotech *Health, Safety, and Security Desktop Procedures Manual* for posting RWP, survey and decontamination requirements
Airborne Radionuclides	>10% of DAC	Follow Geotech *Health and Safety Manual*, Volumes 1 and 2; also Geotech *Health, Safety, and Security Desktop Procedures Manual* for posting RWP, bioassay requirements
	>100% of DAC	Respiratory protection required until airborne radioactive levels are reduced to less than 100% of a DAC
Noise levels	85dBa for 8h TWA	Follow Geotech *Health and Safety Manual*, Volume 1; procedure 5.5

Table 4–1 (continued). Actions Required for Specific Exposure Monitoring Results

Parameter	Action Level	Action Required
Metals (as analyzed in closed face total dust samples)	Action Level = 50% Mixture PEL or Single Metals Action Levels (all values in mg/m³) Ag >0.005 Ni >0.025 Be >0.001 Sb >0.25 Cd >0.0025 Se >0.1 Cr >0.025 Tl >0.05 Cu >0.5 V_2O_5>0.025 Pb >0.030 Zn>5 Mo >5	Respiratory protection required when breathing zone concentrations are at or above action level
VOCs	5 ppm Photo Ionization Detector (PID) Real Time Analysis (RTA)	Evacuate and evaluate situation; don APR before returning to monitor area
CO	17 ppm RTA	Continuously monitor, maintain exposure to less than 35 ppm TWA
Silica	0.05 mg/m³ Respirable Dust	Don APR; evaluate engineering controls
Total Dust	5 mg/m³ RTA	Don APR; evaluate engineering controls
Heat Stress	> 77 °F WBGT	Monitor temperature with a WBGT and initiate work/rest regime to reduce exposure below TLV for work load.
Cold Stress	61 °F dry bulb temperature	Suitable thermometry should be arranged at any workplace where the environmental temperature is below 61 °F so that overall compliance with the TLV can be maintained. • If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 61 °F, special provisions should be established for keeping hands warm. • If the air temperature drops below 61 °F for sedentary, 40 °F for light, 20 °F for moderate work and fine manual dexterity is not required, then gloves should be used by the workers.
	40 °F dry bulb temperature	Evaluate worker clothing in conjunction with task and work load for adequacy to prevent hypothermia. Evaluate wind speed for wind chill effect.
	36 °F dry bulb temperature	At air temperature of 36 °F or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.
	30 °F dry bulb temperature	Dry bulb temperature and wind speed recorded every 4 hours.
	20 °F ECT	If work is performed continuously in the cold at or below an equivalent chill temperature (ECT) of 20 °F, heated warming shelters should be made available nearby.
	10 °F ECT	Work practices as outlined in the ACGIH TLV for cold stress should be followed.

4.3 PPE Defined

PPE are defined in this HSP by letter designator on the basis of the general level of protection afforded by the ensemble. The general classifications are listed below:

- **Level D**

  Includes basic work clothing ensemble used as the minimum level of PPE for work. This ensemble includes worker-supplied sturdy work pants, sleeved shirt, and sturdy work boots. Level D may also include additional industrial safety PPE such as steel-toed shoes, hard hat, safety glasses, and hearing protection.

- **Modified Level D**

  Includes Geotech-supplied protective gloves, nonpermeable boots, and cotton or disposable coveralls. Used during conditions requiring moderate dermal protection; excludes any respiratory protection.

- **Level C**

  Includes Geotech-supplied protective gloves, nonpermeable boots, Tyvek coveralls, and a properly selected full-face air-purifying respirator (APR). Used during conditions requiring moderate dermal and respiratory protection.

- **Modified Level C**

  Includes Geotech-supplied protective gloves, nonpermeable boots, poly-coated Tyvek coveralls and a properly selected full-face APR. Used during conditions requiring a high level of dermal and moderate respiratory protection.

- **Level B**

  Includes Geotech-supplied protective gloves, nonpermeable boots, poly-coated Tyvek coveralls, and a properly selected full-face air-line respirator or self-contained breathing apparatus. Used during conditions requiring a high level of dermal and respiratory protection.

Note: Current protection from the **Hantavirus** includes Geotech-supplied protective gloves and a properly selected half-face or full-face air-purifying respirator.

The ensemble components required to provide level D, modified level D, level C, modified level C, and level B protection are listed in Tables 4–2 through 4–7, respectively. In all cases, the proper selection of respiratory protection must be made through the completion of a respiratory selection checklist by a qualified OH&S representative.

Note: Because of the diversity of protection requirements, some of these general classifications for protection levels have multiple definitions listed in Tables 4–2 through 4–7. For example, two tasks may require different modified level D ensembles, or a single task may be performed in areas containing different hazards.

Table 4–2. Level D Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	No	
Head	Yes*	Hard hat meeting ANSI Z89.1
Eyes	Yes*	Safety glasses (with side shields optional) meeting ANSI Z87.1. Safety glasses are recommended to be worn at all times.
Ears	Yes*	
Face	No	
Hands	Yes*	Leather or sturdy cotton work gloves
Arms	Yes	Employee-supplied long or short sleeve work shirt
Trunk	Yes	Employee-supplied long or short sleeve work shirt
Legs	Yes	Employee-supplied work pants
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

* As assigned by the SHSC, on the basis of specific tasks and site conditions.

Table 4–3. Modified Level D Defined (Dry Conditions)

Route of Exposure	Protection Required?	Type of PPE
Respiratory	No	
Head	Yes*	Hard hat meeting ANSI Z89.1
Eyes	Yes*	Safety glasses (with side shields optional) meeting ANSI Z87.1. Safety glasses are recommended to be worn at all times.
Ears	Yes*	
Face	No	
Hands	Yes	Leather or sturdy cotton work gloves
Arms	Yes	Coveralls of cotton or similar material
Trunk	Yes	Coveralls of cotton or similar material
Legs	Yes	Coveralls of cotton or similar material
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

* As assigned by the SHSC, on the basis of specific tasks and site conditions.

Table 4–4. Modified Level D Defined (Muddy/Wet Conditions)

Route of Exposure	Protection Required?	Type of PPE
Respiratory	No	
Head	Yes[a]	Hard hat meeting ANSI Z89.1
Eyes	Yes[a]	Safety glasses (with side shields optional) meeting ANSI Z87.1. Safety glasses are recommended to be worn at all times.
Ears	Yes[a]	
Face	No	
Hands	Yes	Nitrile gloves (>10 mil)
Arms	Yes	Coveralls of Tyvek or similar material; saranex or poly-coated Tyvek under wet conditions
Trunk	Yes	Coveralls of Tyvek or similar material; saranex or poly-coated Tyvek under wet conditions
Legs	Yes	Coveralls of Tyvek or similar material; saranex or poly-coated Tyvek under wet conditions
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

[a] As assigned by the SHSC, on the basis of specific tasks and site conditions.

Table 4–5. Level C Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	Yes	Full-face APR
Head	Yes[a]	Hard hat meeting ANSI Z89.1
Eyes	Yes	Full-face APR
Ears	Yes[a]	
Face	Yes	Full-face APR
Hands	Yes	Nitrile gloves (>10 mil)
Arms	Yes	Coveralls of Tyvek or similar material
Trunk	Yes	Coveralls of Tyvek or similar material
Legs	Yes	Coveralls of Tyvek or similar material
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

[a] As assigned by the SHSC, on the basis of specific tasks and site conditions.

Table 4–6. Modified Level C Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	Yes	Full-face APR
Head	Yes[a]	Hard hat meeting ANSI Z89.1
Eyes	Yes	Full-face APR
Ears	Yes[a]	
Face	Yes	Full-face APR
Hands	Yes	Nitrile gloves (>10 mil)
Arms	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Trunk	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Legs	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

[a] As assigned by the SHSC, on the basis of specific tasks and site conditions.

Table 4–7. Level B Defined

Route of Exposure	Protection Required?	Type of PPE
Respiratory	Yes	Full-face SCBA/Air-Line
Head	Yes[a]	Hard hat meeting ANSI Z89.1
Eyes	Yes	Full-face SCBA/Air-Line
Ears	Yes[a]	
Face	Yes	Full-face SCBA/Air-Line
Hands	Yes	Nitrile gloves (>10 mil)
Arms	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Trunk	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Legs	Yes	Coveralls of Saranex or poly-coated Tyvek or similar material
Feet	Yes	Rubber overshoes worn over sturdy-sole, smooth leather-upper work boot meeting ANSI Z41.1–75; or Bata Hazmax, poly-blend or super-poly, boots

[a] As assigned by the SHSC, on the basis of specific tasks and site conditions.

5.0 Training Program

5.1 Introduction

The training program is designed to address the requirements of

- OSHA "Hazardous Waste Operations and Emergency Response Standard," 29 CFR 1910.120.
- OSHA "Hazardous Communications Standard," 29 CFR 1910.1200.
- All reciprocal Utah OSHA Regulations.
- Geotech *Health and Safety Manual*, Volume 1, Chapter 9.
- DOE *Guidance For Training Manual.*

Table 5–1 contains an outline of the training requirements.

5.2 Pre-Project Training

Off-Site Training

All employees and subcontractors who could potentially be exposed to hazardous materials must have successfully completed a formal training program that included a minimum of 40 hours of initial off-site instruction, in accord with OSHA 29 CFR 1910.120, and a minimum of 24 hours documented field experience under the instruction of a trained, experienced supervisor.

Management directly responsible for on-site operations and supervisors directly responsible for employees engaged in hazardous waste site operations must complete at least 8 additional hours of specialized training on managing such hazardous waste site operations at the time of job assignment.

Workers who are exposed to unique or special hazards must have additional training, the level of which must be consistent with the employee's job function and responsibilities.

The standard Red Cross first aid and cardiopulmonary resuscitation (CPR) training is required for all supervisory personnel assigned to the site.

All employees will be current in training as noted above and as applicable by meeting the refresher requirements of OSHA 29 CFR 1910.120.

Site-Specific Training

This training will be conducted by an OH&S technician and coordinated by the construction inspector or a designated alternate. This training will be provided from an approved lesson plan on the basis of the requirements of this HSP.

The content of the training will include but not be limited to

- Names of personnel and alternates responsible for site health and safety.
- Safety, health, and other hazards present on the site.
- Proper use of PPE.
- Approved SOPs and emergency response actions.
- Safe use of engineering controls and equipment on the site.
- The medical surveillance program.
- Site access controls and methods of posting in controlled areas.
- Requirements for confined space entries.

Radiation Worker Training

All employees will receive General Employee Radiological Training (GERT) and Radiation Worker Training as provided by Geotech *Health and Safety Manual*, Volume 2, Chapter 6. This training meets the requirements of DOE Order 5480.11 for radiation worker qualifications.

Hazard Communication Training

All employees will receive Hazard Communication Training as defined by Geotech *Health and Safety Manual*, Volume 1, Procedure 8.11. This training will be coordinated by the construction inspector or a designated alternate, with support from OH&S.

Respirator Training

Employees will receive respiratory protection training as defined by Geotech *Health and Safety Manual*, Volume 1, Procedure 9.6. This training meets the requirements of the ANSI Z88.2–1980, *Respiratory Protection*. This training must be completed when job site conditions require the use of respiratory protection equipment.

Table 5–1. Training as Required by Section 5.0

Training	Frequency	Length
Rad Worker Training II	Every 2 years	16 hours
General Employee Rad Training	Every 2 years	1 hour
Rad Worker Training Refresher	Alternate years when RWT retraining is not required	8 hours
Hazardous Waste Site Training (OSHA 29 CFR 1910.120)	Once	40 hours
Hazardous Waste Site Refresher Training (OSHA 29 CFR 1910.120)	Annually	8 hours
Hazardous Waste Site Training Specific Limited Tasks (OSHA 29 CFR 1910.120	Once	24 hours
Hazardous Waste Site Supervisor Training (OSHA 29 CFR 1910.120)	Once (supervisory personnel)	8 hours
First Aid and CPR	Annually (supervisory personnel)	4 hours, CPR 4 hours, First Aid
Hazard Communication Training	Ongoing as hazards change	various
Site Specific Training	Annually	various
"Tailgate" Safety Meeting	Weekly	various
On-the-Job Training (29 CFR 1910.120)	Once	24 hours
Hantavirus	Every two years	30 minutes

5.3 "Tailgate" Safety Meetings

Weekly "tailgate" safety meetings will be conducted for Geotech employees by the project manager or a designated alternate and documented on Training Attendance Sheets (GJPO 1720).

Meeting agendas will include but are not limited to

- Health and safety considerations and necessary PPE for current operations.
- Any addenda to this HSP or field changes to the site-specific HSPs.
- Any new material safety data sheets (MSDSs) filed on site.
- Any new health and safety hazards.

5.4 Training Records

All training that is conducted by or for Geotech will be documented on Training Attendance Sheets.

Successful completion of Geotech facilitated training, as specified in this section, is required for all employees and subcontractor employees prior to their commencement of work on the site. Proof of training completion will be required prior to an employee being given access to the site.

Official training records will be maintained by the Geotech Training Section. Copies will be maintained in the OH&S project file.

5.5 Employee Responsibilities

Employees shall check with their line managers to ensure that they have received the required training for their assigned duties and responsibilities prior to commencing those tasks. Employees shall ensure that their training remains current. The Health and Safety Training Record (GJPO 1761) should be updated immediately after training has been completed.

5.6 Line Manager Responsibilities

Line managers shall ensure that only qualified and properly trained personnel perform assigned work according to the Geotech *Management Policies Manual* (Manual 100), Sction 14, and the Geotech *Health and Safety Manual*, Volume 1, Policy 1.0.

5.7 Construction Inspector and SHSC Responsibilities

The construction inspector shall maintain a current list of personnel who have completed the millsite pre-entry briefing. During the pre-entry briefing conducted by the OH&S, training requirements for site entry shall be reviewed. The construction inspector shall instruct the millsite gatekeeper to deny access to any employee unless (1) the employee's Health and Safety Training Record documents that the appropriate training has been completed and is current and (2) the employee's name is listed on the site briefing list.

Both the construction inspector and SHSC shall carry out spot checks for personnel training. Any untrained employee must immediately be expelled from the millsite, the project manager must be informed, and an Event Fact Sheet (GJPO 1743) must be generated in accord with the Geotech *Health and Safety Manual*, Volume 1, Chapter 7.

6.0 Medical Surveillance Program

6.1 Consulting Physicians

Geotech's company physicians and clinics are

Dr. Doug C. Scott
2547 B-3/4 Road
Grand Junction, CO
303-248-6100

Dr. Stephen Warren
Monticello, UT
801-587-2282

Blanding Clinic
Dr. James D. Redd
Dr. L. Val Jones
Dr. W. Gene Key
930 North, 400 West
Blanding, UT
801-678-2254

Canyon Country Medical Clinic
Dr. James D. Redd
80 West, 200 South
Monticello, UT
801-587-3091

Drs. Scott and Warren are familiar with the hazardous materials identified in Section 3.0 that are identified aspotential worker exposure hazards during the work on MRAP.

6.2 Emergency Treatment Facility

The emergency treatment facility designated for use in emergency treatment of injuries or illness is

San Juan Hospital
364 W. 1st North
P.O. Box 308
Monticello, Utah 84535
801-587-2116

The Manager, Occupational Medical Program (OMP), has familiarized the physicians at this facility with the hazardous substances identified in Section 3.0 that are potential worker exposure hazards during the work at MRAP.

This facility will be used in the event of emergency treatment of a worker, such as contaminated injured persons needing immediate life-saving medical attention. If required by San Juan Hospital, the OH&S technician shall accompany any medical emergency victims to supervise decontamination efforts at the emergency treatment facility. Decontamination of injured persons who are not medical emergencies will be conducted by the OH&S technician prior to transportation to the treatment facility. These procedures are addressed in detail in the Geotech *Health, Safety, and Security Desktop Procedures Manual*, Section 3.

The backup emergency treatment facility is

St. Mary's Hospital and Medical Center
2635 North 7th Street
Grand Junction, Colorado 81504
303–244–2273

Transportation would be accomplished via the St. Mary's Air Flight for Life Helicopter.

The OH&S technician shall ensure that the map providing the location of San Juan Hospital, including primary and secondary travel routes from the millsite, is posted in a location conspicuous to all workers at the millsite and repository site.

6.3 Physical Examinations

All Geotech personnel on site who may be exposed to hazardous material must (at no cost to themselves) have successfully completed a pre-placement or periodic/update physical examination.

Subcontractor personnel must meet the medical requirements of OSHA 29 CFR 1910.120.

The examination requirements listed in this section have been designed to comply with OSHA 29 CFR 1910.120 requirements for hazardous waste operations.

Individuals who are not required to wear respirators do not need to be medically qualified to wear respirators.

Initial Examinations

Initial examinations for Geotech employees shall include

- Completion, by the employee, of a History and Physical Exam form (Geotech 1616B)
- Complete blood count with differential
- SMAC 23
- Urinalysis (dipstick and microscopic)
- Chest x-ray (only if Geotech does not have one on file)
- Audiogram
- Electrocardiogram
- Visual acuity
- Heavy metals (blood/urine—baseline performed prior to start of work)

Subcontractor Employees

All subcontractor employees who have potential for exposure to hazardous substances at or above the permissible exposure limit should have successfully completed an examination similar to the initial physical specified for Geotech employees.

The cost for medical surveillance shall be paid by the subcontractor.

Injury or Illness Reexaminations

Employees of Geotech shall be given another physical if

- They are suspected of having an overexposure to the hazardous materials on site.
- They develop a lost-time illness of 5 working days or more.
- They sustain any lost-time injury.

Geotech employees located in Monticello, Utah, will see the consulting physician as directed by Geotech's contract physician.

Subcontractor employees will be seen by the subcontractor's physician at the subcontractor's expense. Subcontractors will notify Geotech within 24 hours of any work-related injury or illness.

If an injury or illness is the result of a hazardous-material exposure, the OH&S supervisor shall promptly notify the consulting physician and treating physician of the material identified as what caused the exposure.

Hazardous material identification may be accomplished through the use of

- Real-time monitoring equipment (photoionization detectors in conjunction with detector tubes).
- Conventional industrial hygiene monitoring (lapel air sampling, dermal exposure patch, etc.).
- Any prior sampling results available.
- Reexamination requirements, the scope of which will be specified by the Manager, OMP, and the consulting physician.
- A physician's completion of a Physician's Recommendation for Return to Work form (GJPO 1574), including the specification, if necessary, of any activity restrictions) after that physician's reexamination of each employee to certify that the employee is fit to return to work.
- Specific emergency procedures to be followed in the event of an injury or illness occurrence on the site are covered in Section 10.0 of this HSP.
- Requirements for reporting off-normal events are specified in Geotech *Health and Safety Manual*, Volume 1, Chapter 7.

Termination

All personnel must complete a physical examination upon termination.

6.4 Medical Records

Personnel medical and exposure monitoring records must be maintained in accord with the requirements specified in OSHA 29 CFR 1910.120 and must be kept for a minimum of 30 years after termination. Employee confidentiality must be maintained.

Employees must be notified annually of

- The status and result of medical examinations.
- The right to access those records at any time.
- Where and how to access medical records.

6.5 Employee Responsibilities

Employees must check with OMP to ensure that they have met the required medical surveillance protocols for their assigned job duties and responsibilities prior to commencing those tasks. Compliance with those protocols must be documented on an Occupational Medical Program Employee Information form (GJPO 1763). In addition to completing all medical surveillance protocols designated by the OMP manager, an employee must complete a Worker/Supervisor Medical Checklist (GJPO 1883) and submit that completed form documenting that employee's medical surveillance status to the Monticello Office administrator who maintains the on-site files.

6.6 Line Management Responsibilities

Line managers shall ensure that subordinate employees have completed the medical surveillance requirements before assigning those employees to work activities on the millsite.

6.7 Manager, Occupational Medical Program, Responsibilities

The Manager, OMP, manages the medical surveillance program and maintains the medical and administrative records associated with the implementation of the program. The Manager (or designee), OMP, will assist project personnel in matters related to the medical surveillance activities (e.g., employee medical surveillance status, first-aid kits, accitent reporting).

6.8 Construction Inspector and SHSC Responsibilities

The construction inspector shall deny access to any employee whose medical surveillance status does not meet the site requirements.

If an employee has not provided documentation (via the GJPO 1883 form) of required medical surveillance, the construction inspector or SHSC may obtain verbal verification from OMP.

Both the construction inspector and SHSC shall carry out spot checks for personnel medical surveillance requirements. Any employee not meeting the designated requirements shall be expelled immediately from the millsite. For each occurrence of unauthorized access, the construction inspector shall initiate the off-normal-events reporting process as specified in the Geotech *Health and Safety Manual*, Volume 1, Chapter 7. The reporting category for this incident is "off-normal occurrence."

7.0 Exposure Monitoring

7.1 Equipment and Instrumentation

The procedures for the operation and maintenance of real-time, direct-reading, air-monitoring instruments and personal sampling equipment for radiological and industrial hygiene parameters are in the Geotech *Health and Safety Manual*, Volumes 1 and 2, and the Geotech *Health, Safety, and Security Desktop Procedures Manual.*

7.2 Monitoring Strategy

Pre-Entry Monitoring

Pre-entry monitoring must be conducted during the initial site visit to the millsite. Air monitoring must identify any IDLH conditions, exposure over the permissible exposure limit or published exposure levels, cumulative exposure to radiation, or other dangerous conditions such as flammable or oxygen-deficient environments.

Initial Characterization Monitoring (Nonradiological)

OH&S must conduct initial air monitoring to characterize the exposures for each job category. The scope of this monitoring must be based on the results of the pre-entry monitoring. Characterization monitoring of suspected or identified hazards must be conducted according to Table 7–1. Real-time analysis (RTA) instrumentation may be used whenever feasible. When real-time instrumentation readings are documented, they should be documented for three 8-hour periods.

Characterization is not complete until results are confirmed by R&ES and documentation of this characterization is available at the project site through the SHSC. The SHSC must maintain the documentation and make it available to workers throughout the completion of the task.

Initial characterization monitoring must be conducted on those workers who represent the highest exposure potential for that job classification. The number of workers included in the air monitoring must be expanded from only high-risk workers to additional workers when exposures are suspected of exceeding action limits.

Periodic Monitoring (Nonradiological)

Periodic air monitoring of hazards identified during the characterization monitoring must be conducted after initial air monitoring has been completed. Periodic monitoring requirements must be outlined in the phase-specific appendix. The results of periodic monitoring are to be used to confirm the initial characterization of project site hazards.

Table 7–1. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Dose rate meter	At, and within, general area boundaries	Initially and periodically
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	All personnel and materials shall be frisked prior to release from control point boundary. All tools/equipment surveyed prior to release from control point boundary.	
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area; area boundaries	Initially and periodically
Airborne Radioparticulates	Particulate filter sample	Breathing zone of up to 50 percent of all workers subject to highest levels.	Initially and periodically
Airborne Radioparticulates	Particulate filter sample	Area sample at boundary of posted airborne radioactivity area.	Initially and periodically
Metals	37mm cassette sample	Breathing zone of workers subject to highest levels.	Initially and periodically
Organic Vapors	1) PID/flame ionization detector (FID) 2) Various integrated sampling methods	Breathing zone of workers subject to highest levels	Initially and periodically
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Initially and periodically
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	Initially and periodically
Heat Stress	WBGT/Questemp	Area	As needed
Cold Stress	Calibrated thermometer	Area	As needed
Noise	Personnel noise dosimeter	Hearing zone of workers	As needed
Noise	Sound level meter	Area	As needed

Periodic air monitoring must be discontinued and initial characterization monitoring must be re-established should the following conditions occur:

- Initial characterization conditions significantly change (summer to winter).
- Work begins on a characteristically different portion of the project site.
- Contaminants other than those previously identified are being handled.
- A different type of operation or task is initiated.
- Workers are performing tasks in areas of obvious liquid contamination.

Radiological Monitoring

During the initial site visit to the millsite, area radiological monitoring for surface contamination, radiation levels, and general area dose rates must be performed in sufficient detail to characterize the exposure. Radiological areas shall be established as required by the Geotech *Health and Safety Manual*, Volume 2, Chapter 2.

Periodic area radiological monitoring must be performed to identify any significant changes in exposure levels inside and at the boundaries of posted radiological areas. Periodic area radiological monitoring is to be conducted at routine intervals independent of the previous characterization data obtained.

Personnel radiation exposure will be monitored through the use of assigned thermoluminescent dosimeters (TLDs). Upon exiting the access/frisking station at the end of the scheduled work day, all TLDs must be surrendered and stored overnight in a designated storage area containing the control TLDs.

7.3 Bulk Samples

Bulk sampling of soils must be conducted routinely to update the information about hazards of exposure from the material. When bulk samples are submitted for toxicity characteristic leaching procedure (TCLP), a total metals analysis must also be requested.

8.0 Project Site Control

8.1 Site Map

The construction inspector must ensure that a sign board is posted at each access to the millsite. The board must include a site map of the project site and indicate the locations of

- First aid stations.
- Evacuation routes.
- Fire control equipment.
- Communications equipment.

8.2 Work Zone Definitions and Postings

Areas that contain safety or health hazards where workers could be exposed to hazardous substances at or above the published or permissible exposure limits must be posted as specified in the Geotech *Health and Safety Manual*, Volume 1, Chapter 5 (Figure 8–1 is an example of work zone control).

8.3 Work Zones Establishment

Work zones (with adequate barricades at the boundaries) must be established, as necessary, to provide protection for untrained and unprotected personnel. The SHSC shall assist the construction inspector in establishing proper controls by

- Directing the proper placement of all control barricades at the millsite, including the placement of the radiological area and exclusion area boundaries. Changes to established boundaries must be approved by the SHSC.
- Directing the establishment of a control point at the end of the decontamination corridor. Proper operation of the control point will control the flow of personnel and equipment into and out of the radiological area and exclusion area.
- Communicating the entry requirements for the radiological areas and exclusion areas to all personnel at the project site.
- Maintaining a hazardous materials access log for the project.
- Posting all radiological control signs.

8.4 Site Communications

Systems that will be used to provide communications at the project site are listed in Table 8–1.

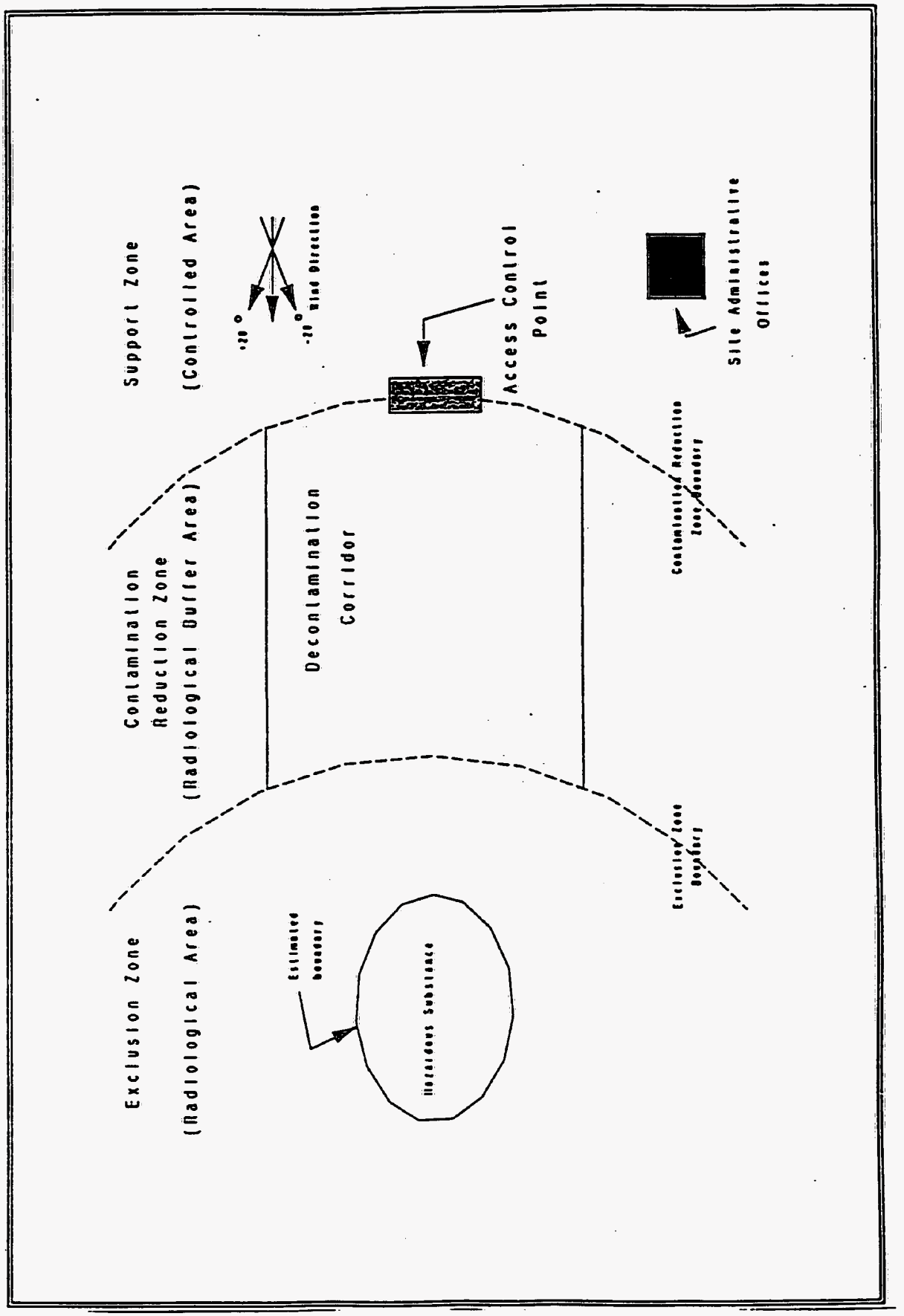

Figure 8–1. Work Zone Schematic Representation

Table 8–1. Communication Systems at Project Site

Type of Communication	Method	Use
Direct	Radio - Construction Base	Routine communication between field team members and Geotech facilities
	Face to Face	Face-to-face communication in areas where background noise inhibits voice communication

Additional emergency communication procedures information apears in section 10.0 of this HSP.

8.5 Safe Work Practices

Geotech personnel shall ensure that the "buddy system" is used for all operations at the project site, according to the Geotech *Health and Safety Manual*, Volume 1, Procedure 2.6.

The SHSC must maintain the following procedure manuals to be used at the project site for standard operating procedures:

- Geotech *Health and Safety Manual*, Volumes 1 and 2.
- Geotech *Health, Safety, and Security Desktop Procedures Manual*

To promote safety further and prevent accidents, Geotech will initiate and maintain frequent and regular inspections of the job site, materials, and equipment by designated competent safety professionals. Only qualified personnel will operate equipment and machinery. Employees must be trained in recognition, avoidance, and prevention of unsafe conditions:

- Fire Protection and Prevention—An effective fire protection and prevention program will be in place throughout all phases of the construction, repair, alteration, or demolition work, in accord with the *Health and Safety Manual*, Volume 1, Procedure 2.18. The Monticello Fire Department will provide fire suppression.
- Housekeeping—During the course of construction, debris must be kept clear of all work areas and passageways, and combustible scrap must not be allowed to accumulate outside proper containers. Containers must be available for appropriate separation and storage of trash.
- Head Protection—Employees working in areas where head injury is possible from impact, falling or flying objects, electrical shock, or burns must be protected by appropriate head protection meeting the requirements of ANSI Z 89.1.
- Eye and Face Protection—In environments where machines or operations can potentially cause eye or face injuries from physical, chemical, or radiation agents, employees must be provided with and properly wear eye and face protection, meeting the requirements of ANSI Z87.1.

- Noise—Protection against the effects of noise exposure must be provided when sound pressure levels exceed a time-weighted average of 85 dB(A), as stipulated in the *Health and Safety Manual* (Manual 103), Section 8.5.

- Electrical—Electrical work must be done in accord with the *Health and Safety Manual*, Volume 1, Procedure 2.11. The employer must ensure that electrical equipment is free from recognized hazards likely to cause physical harm to employees. All 120-volt, single-phase, 15-and-20-ampere receptacle outlets on construction sites that are not part of the permanent wiring of the building or structure and that are in use by employees must have approved ground-fault circuit interrupters for personnel protection. Equipment or circuits that are de-energized must be rendered inoperative and must have tags and locks attached at all points where such equipment or circuits can be energized.

- Scaffolding—Scaffolds must be erected and used in accord with the OSHA regulations in 29 CFR 1926.451.

- Cranes—The employer must comply with the DOE *Hoisting and Rigging Manual* and with the manufacturer's specifications and limitations applicable to the operation of any and all cranes. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field, and such determinations must be appropriately documented and recorded. Attachments used with cranes must not exceed the capacity, rating, or scope recommended by the manufacturer.

- Motor Vehicles and Mechanized Equipment—All vehicles in use must be checked at the beginning of each shift to assure that all parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use. Particular attention should be paid to the service brakes (including trailer brake connections), parking system (hand brake), emergenc stopping system (brakes), tires, horn, steering mechanism, coupling devices, seat belts, operating controls, and safety devices (such as back-up alarms). All safety defects must be corrected before the vehicle is placed in service. This requirement also applies to equipment such as lights, reflectors, windshield wipers, defrosters, and fire extinguishers, where such equipment is present.

- Excavations—All excavations must be done in accord with the OSHA regulations found in 29 CFR 1926.650-652 under the direction of a competent person as defined in 29 CFR 1926.650(b).

- Safe Work Permits—Special situations that require additional safety attention must be covered by a safe work permit (SWP). Employees, supervisors, and health and safety personnel must use SWPs to address safety concerns before work begins.

- Eating, Drinking, and Smoking—In areas posted as "no eating, drinking, or smoking," food, beverages, drinking water, cosmetics, and tobacco products shall not be permitted.

8.6 Visitors

General

The term "visitor" as used in this section cannot be applied to any Geotech employee. Visitors include DOE employees, Geotech clients, Federal and State regulatory officials, parent corporation employees, and potential subcontractors taking part in bid tours.

Acting as the primary remedial action contractor, the responsibilities Geotech has accepted include protecting the safety and health of visitors to project sites. However, the extent of visitor activities during a project site visit should be limited to observation of activities, review of documentation, and bid tour inspections.

Visitor Access at the Project Site Outside Hazardous Areas

Visitor access will normally be restricted to the support zones (outside any controlled area or contamination reduction zone boundary). This restriction will prevent visitors from exposure to the hazardous substances present. Visitors must be escorted by a trained Geotech employee at all times. OH&S must provide visitors with an abbreviated version of the site-specific training provided to workers. Such visitor training must include the following information:

- Names of personnel and alternates responsible for site safety and health.
- Safety, health, and other hazards present on the project site.
- Practices by which the visitor can minimize risks from hazards.
- Safe use of engineering controls and equipment on the project site.
- Recognition of symptoms and signs that might indicate overexposure to hazards.
- Contents of the emergency response plan.
- Proper use of required personal protective equipment.

Visitor Access into Hazardous Areas

Visits should not normally include entry into areas where visitors may be exposed to hazardous substances existing at the millsite. Allowing a visitor to become exposed violates both the requirements established in Geotech's ALARA program and good industrial hygiene practices.

When the requirements of a visit absolutely must include visitor access to an area where exposure may occur, the following minimum requirements (established by Geotech) apply for the safety and health of the visitors:

Access Authorization—The Monticello program manager or designee must be assured that adequate reason exists for the visitor to be exposed potentially and that visitor access must be provided. The Monticello program manager must authorize the SHSC in writing to permit access. Access will be provided only after documentation of training and medical surveillance is received in conjunction with the access authorization.

Training—In the event that a person (normally a visitor) needs to perform work at a site requiring a level C or higher PPE, Geotech will require documentation of the satisfactory completion of training as required by OSHA 29 CFR Part 1910.120(e). This documentation includes

- Providing Geotech with a certificate for 24 hours of off-site instruction if level C PPE is required in accord with OSHA 29 CFR Part 1910.120(e)(3).

- Providing Geotech with a certificate for 40 hours of off-site instruction if level B or greater PPE is required in accord with OSHA 19 CFR 1910.120 (e)(3).

- Completing the Geotech-facilitated introduction to radiation safety and the Visitor Dosimetry Issue Form (GJPO 1772) in accord with DOE Order 5480.11.

- Completing the Geotech-facilitated site-specific training in accord with OSHA 29 CFR Part 1910.120(e)(2). This training includes the required pre-entry briefing in accord with OSHA 29 CFR Part 1910.120 (b)(4)(iii).

- Completing the Geotech-facilitated hazard communication training in accord with OSHA 29 CFR Part 1910.120(h)2.

- Documenting actual field experience training under the construction inspector's direct supervision in accord with OSHA 29 CFR Part 1910.120(3)(3) during the first 8 or 24 hours at the project site.

Medical Surveillance

Geotech will support the medical surveillance program requirements for the visitor's employer, if one is established, by providing the visitor's employer with

- Information detailing the nature, level, and degree of exposure likely as a result of participating in site operations in accord with OSHA 29 CFR 1910.120(i).

- Monitoring data gathered during the visit that represent the visitor's exposure levels, including radiation dose information.

- Description of the PPE used by the visitor.

In the event that a baseline radionuclide bioassay is required before entry into a particular area of the millsite, the visitor will be informed.

9.0 Decontamination

9.1 PPE and Personnel Decontamination

PPE worn during on-site work activities must not be worn outside the decontamination corridor. All personnel shall use the step-off decontamination sequence (Tables 9–1 and 9–2) during egress from the controlled area (contamination reduction zone). When an RWP or SWP has been used to modify the PPE requirements of this HSP, the RWP or SWP should also contain any changes required to update the decontamination procedures listed in this section. The SHSC shall assist the construction inspector in establishing the decontamination stations within the decontamination corridor, including all requisite equipment and receptacles.

PPE removed from the decontamination corridor must either be decontaminated or properly bagged to contain any contamination. All used disposable clothing must be placed in polyethylene bags and stored at the millsite pending arrangements for appropriate disposal. Waterproof nondisposable PPE must be properly decontaminated and may be reused if released for unrestricted use by an OH&S technician. If radioactive contamination is still detected after the step-off decontamination sequence is complete, follow the decontamination procedures in Geotech *Health and Safety Manual*, Volume 1, Procedure 3.17, for removal of radioactive contamination from nondisposable PPE and personnel.

9.2 Equipment Decontamination

All visible dirt must be removed from equipment. Decontamination procedures contained within the sampling plan must be followed prior to removal of the material from the controlled area.

Radioactive surface contamination surveys must be performed by the SHSC or another OH&S technician designated by the SHSC prior to release of the equipment from the decontamination corridor.

If radioactive contamination is detected on the sampling equipment, follow the decontamination procedures specified in the Geotech *Health and Safety Manual*, Procedure 3.17, for removal of radioactive contamination from the sampling equipment.

Equipment that may be contaminated with the Hantavirus must be decontaminated in accord with Procedure 8.15, "Hantavirus Precautionary Measures," to be published in the *Health and Safety Manual*, Volume I (Manual 103).

Table 9–1. Decontamination Stations for Modified Level C and Level C PPE

Station	Name	Action	Equipment Required
1	Segregated Equipment Drop	Deposit equipment used at project site (tools, sampling devices/containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths; segregation at drop reduces probability of cross contamination.	a. Large plastic containers b. Plastic liners c. 6-mil plastic drop cloths
2	Boot Cover/ Glove Wash Boot Cover/ Glove Rinse	Scrub outer boot covers/gloves with decontamination solution. Rinse off decontamination solution from station 2 using water.	a. #10 wash tub (2) b. Decontamination solution or detergent water in hand held sprayer. c. 2-3 long handled, soft bristled scrub brushes.
3	Tape Removal Boot Cover Removal Glove Removal	Remove tape around boots/ gloves; deposit in plastic lined container. Remove boot cover; deposit in container with plastic. (Not required when wearing Bata boots.) Remove outer gloves; deposit in plastic lined container.	a. Large plastic containers b. Plastic liners c. 2-3 long handled, soft bristle scrub brushes
4	Tyvek Suit Removal Respirator Removal Inner Glove Removal	Remove Tyvek suit; deposit in plastic lined container. Remove respirator facepiece; deposit in plastic lined container. Remove inner gloves; deposit in plastic lined container.	a. Large plastic containers b. Plastic liners c. 6-mil plastic drop cloths
5	Radiological Contamination Monitoring	Perform radiological contamination monitoring per Geotech *Health and Safety Manual, Volume 1*, procedure 3.7	Alarming contamination survey instrumentation or equivalent.
6	Field Wash	Wash hands/face before leaving project site.	a. Basin, potable water, soap, towels b. Table

Table 9–2. Decontamination Stations for Modified Level D PPE

Station	Name	Action	Equipment Required
1	Segregated Equipment Drop	Deposit equipment used at project site (tools, sampling devices/containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths; segregation at drop reduces probability of cross contamination.	a. Large plastic containers b. Plastic liners c. 6-mil plastic drop cloths
2	Boot Cover/ Glove Wash Boot Cover/ Glove Rinse	Scrub outer boot covers/gloves with decontamination solution. Rinse off decontamination solution from station 2 using water.	a. #10 wash tub (2) b. Decontamination solution or detergent water in hand held sprayer. c. 2-3 long handled, soft bristled scrub brushes.
3	Tape Removal Boot Cover Removal Glove Removal	Remove tape around boots/ gloves; deposit in plastic lined container. Remove boot cover; deposit in container with plastic. (Not required when wearing Bata boots.) Remove outer gloves; deposit in plastic lined container.	a. Large plastic containers b. Plastic liners c. 2-3 long handled, soft bristle scrub brushes
4	Tyvek Suit Removal Inner Glove Removal	Remove Tyvek suit; deposit in plastic lined container. Remove inner gloves; deposit in plastic lined container.	a. Large plastic containers b. Plastic liners c. 6-mil plastic drop cloths
5	Radiological Contamination Monitoring	Perform radiological contamination monitoring per Geotech *Health and Safety Manual, Volume 1*, procedure 3.7	Alarming contamination survey instrumentation or equivalent.
6	Field Wash	Wash hands/face before leaving project site.	a. Basin, potable water, soap, towels b. Table

10.0 Emergency Response Plan

10.1 Emergency Contacts and Telephone Numbers

Phase-specific emergency contacts and telephone numbers must be posted in a conspicuous location at the project site (next to the site map). The phase-specific emergency contact and telephone numbers chart must be located in the appropriate appendix.

If an emergency occurs, the succession of authority on the project site for the "person in charge," until relieved by the on-scene emergency director (Monticello Fire Deptartment, Police, etc.), is the

1. Geotech field engineer or constructor inspector.

2. Geotech site health and safety coordinator.

3. Subcontractor superintendent.

4. Subcontractor safety representative.

The person in charge must determine the safety area to gather in during the evacuation. A personnel account must be completed against the radiological access log.

The construction inspector must ensure that the site map has the areas within the boundaries of the support zone that are considered areas of safe refuge to be used when evacuation is not possible.

10.2 Emergency Alarms

The construction inspector shall ensure that Table 10–1 is posted on the sign board at the millsite access (next to the site map).

Table 10–1. Emergency Alarms

Alarm	Device/Pattern	Action to be Taken
Evacuation	Air Horn: Two 5-second blasts every 30 seconds for 3 minutes. Hand Signal: Wave both arms above head. Vehicle Headlights: Flash lights two times in rapid succession every 15 seconds for 3 minutes.	Evacuate Controlled Area or Move to an area of safe refuge until evacuation can be effected.
Take Cover	Air Horn: Three 1-second blasts every 30 seconds for 3 minutes. Hand Signal: One arm in a circular motion above head. Vehicle Headlights: Flash lights four times in rapid succession every 15 seconds for 3 minutes.	Evacuate Controlled Area or Move to an area of safe refuge until evacuation can be effected.
All Clear*	Air Horn: One 15-second blast from an air horn. Hand Signal: Clasp hands on top of head. Vehicle Headlights: Turn lights on.	Return to work

* All clear signal will be given when work conditions are considered safe by the project manager or designee.

10.3 Medical Emergency Procedures

Emergency Action Principles

When a medical emergency occurs, the following steps should be taken by the American Red Cross CPR/first-aid trained workers until the person in charge arrives. The American Red Cross has developed these steps as emergency action principles:

1. Survey the scene (is it safe?).

2. Do a **primary survey** by checking the victim for responsiveness.

- A—Airway
- B—Breathing
- C—Circulation

3. Phone the appropriate emergency medical service (EMS) listed on the emergency contacts posting

4. Perform a secondary survey (interview, vital signs, head-to-toe examination).

5. Follow with the appropriate American Red Cross first aid procedure for any follow-up care required until the EMS arrives.

Signs and Symptoms of Exposure

The early warning signs, symptoms, and effects of exposure to hazardous chemicals present at the project site are listed in Section 3.0. Note that the metals listed may be present as oxides.

Medical Evacuation Procedures

The construction inspector must ensure that the evacuation routes to the medical treatment facility are indicated on the site map, posted according to Section 8.0. The approximate time for travel, distance for travel, and written directions to the EMS must also be indicated on the site map included in Appendix B.

Treatment Without Decontamination

When an injured person is contaminated, the person in charge shall decide what priority to give to medical treatment and decontamination. Use the decision aid in the Geotech *Health and Safety Manual*, Volume 1, Procedure 8.2 when making this decision.

When it is determined that decontamination will not take precedence over the treatment of the injury, notify the OMP to inform medical personnel of the contamination. If time does not permit involvement with the medical section, the person-in-charge or the on-scene emergency director may inform the emergency medical personnel of the contamination.

10.4 Fire Response Procedures

The following steps must be taken when a fire occurs at the project site:

- Using the available communications equipment, telephone or radio, contact the Monticello Fire Department and inform them of any hazards that may be present.

- Large uncontrolled fires should be handled by the Monticello fire department. Evacuate and isolate the area, and deny entry of unauthorized personnel.

- If the fire involves material that could potentially release toxic gases, or radioactive particulate, all persons in the immediate area must be evacuated (sound the evacuation alarm); then the fire department must be informed of the potential radioactive or toxic gas hazard.

10.5 Notification and Reporting

The employee discovering the emergency is responsible for immediately reporting the situation by the most expeditious means available to the person in charge at the project site. The person in charge shall follow the requirements of the Geotech *Health and Safety Manual*, Volume 1, Procedure 7.1, "Notification and Reporting."

10.6 Emergency Response Equipment

Communications

Table 10–2 identifies the communication equipment that will be used between the exclusion zone and the support zone and between the project site, the medical treatment facility, and the fire department.

Table 10–2. Emergency Communications Equipment

Communication Equipment	Location
Two-Way Radio (1)	Millsite Trailer
Telephone (private or pay)	Millsite Trailer
Air Horn	Millsite Trailer

Fire Suppression

The construction inspector will ensure that a 10# 4A:60B:C dry chemical fire extinguisher is at all established control points.

Emergency PPE

Table 10–3. lists the PPE that will be kept in reserve for use during an emergency and labeled for "Emergency Use Only."

Table 10–3. Emergency Use of PPE

Personal Protective Equipment		Location
Type	Amount/Size	
Nitrile Gloves	5 pairs/10-11	Millsite Trailer
Rubber Overshoes	5 pairs./L & XL	Millsite Trailer
Tyvek	5 sets (various)	Millsite Trailer
Safety Glasses	5 pairs	Millsite Trailer
Tape	6 rolls	Millsite Trailer

First Aid Kits

The construction inspector must ensure that the site first-aid kits available at the millsite conform to OSHA requirements and contain at least the items listed in Table 10–4.

Table 10–4. Approved First Aid Kits

First Aid Kit Components		Quantity
Bandages:	3" Ace	2
	3" Kling	2
	Bandaids	20
	Triangular Bandage	2
	Oval Size Pads	2
	4" Bandage Compress	2
Tape:	2" Adhesive	1
Disposable Gloves (pr)		3
Betadine Wipes		2
Scissors		1
Thumb Forceps		1
Instant Cold pack		1
Splints:	Wire	1
	Finger	2
Irrigation H_2O:	Eye	2
	Other	2
Ointments:	Neosporin	5
Paper Cups		3
Goggles		2
Aprons		2
Mouth Shields		2
Biological Hazard Bag		1

11.0 Confined-Space Entry

11.1 Introduction

The Geotech *Health and Safety Manual*, Volume 1, Procedure 2.7, defines "confined space" as a space that by design has limited openings for entry and exit, has unfavorable natural ventilation that could contain or produce dangerous air contaminates, and has no provision for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.

All work performed in a confined space must be incompliance with Procedure 2.7 of the Geotech *Health and Safety Manual*, Volume 1.

11.2 Evaluation

The construction inspector must ensure that the requirements for work in a confined space are followed and that a Safe Work Permit (see Geotech *Health and Safety Manual*, Volume 1, Procedure 2.4) is obtained prior to the start of any work conducted in a confined space.

12.0 Spill Containment Program

No tasks currently planned for MRAP warrant a spill containment program.

The following appendices define specific site tasks and requirements applicable to all Monticello millsite work plans.

Note that this HSP does not cover specific work plans for the mill tailings piles.

No work on the mill tailings piles shall be performed without the approval of the Project Safety Officer.

Any specific work task that may cause personal contamination will require at least modified level D personal protective equipment (described in Table 4–3).

Additional requirements may be prescribed through approved RWPs or SWPs.

Appendix A

Monticello Mill Tailings Site
Health and Safety Plan
Signature Sheet

July 1993

Signature Sheet

Name (Please Print)	Signature*	Date

* Signature indicates that this HSP has been read by the individual.

Appendix B

Evacuation Route Map to Medical Facility

Phase-Specific Appendix

July 1993

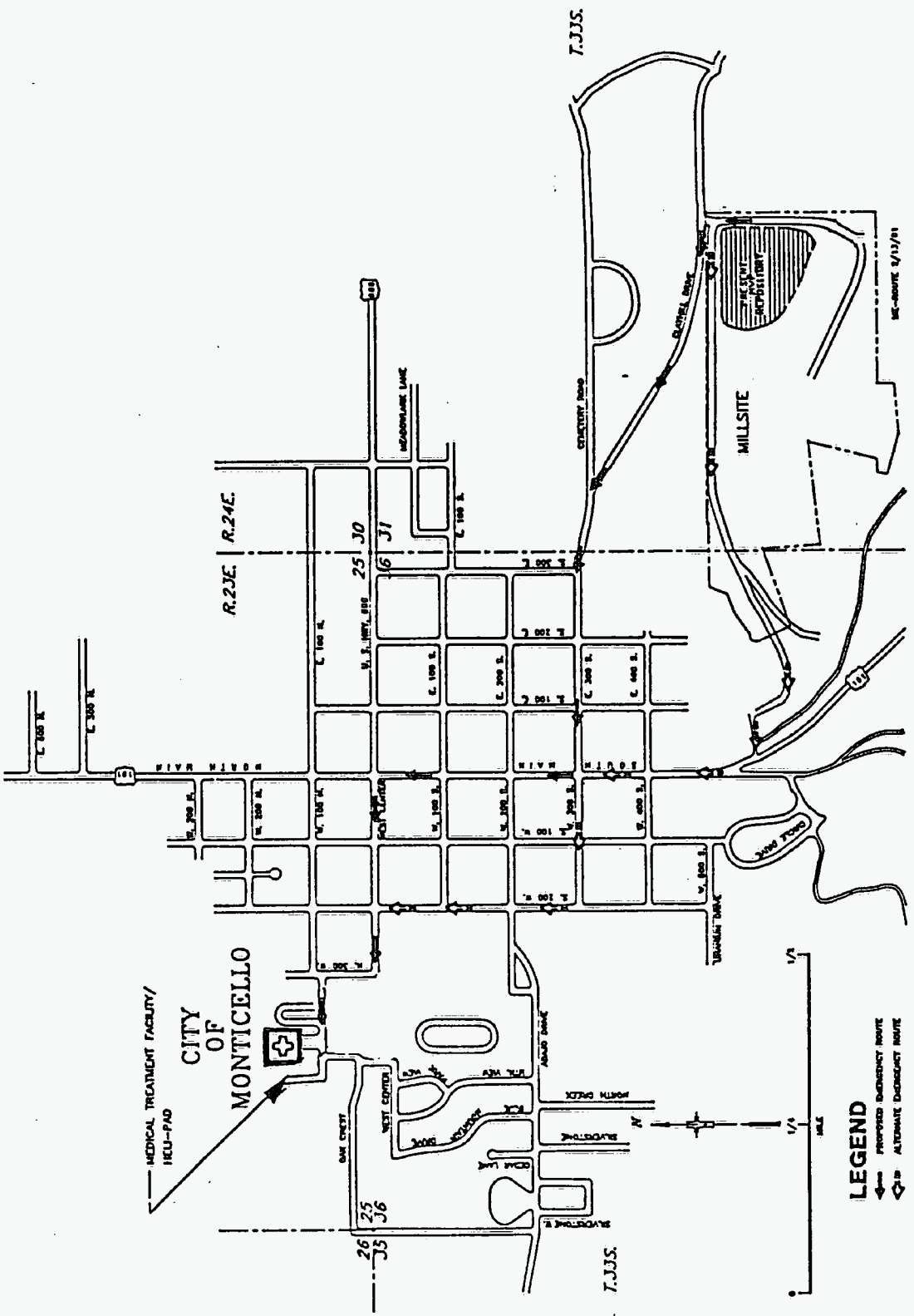

Figure B–1. Evacuation Route Map to Medical Facility

Appendix C

Site Maintenance

Phase-Specific Appendix

July 1993

1.0 General Information

1.1 Project Duration and Scope

The maintenance of the millsite is an ongoing process with heavier work periods occurring in April or May and continuing through November or December. The completion of the millsite maintenance is tentatively scheduled for the fall of 1995. Maintenance will include activities such as upkeep of temporary repository drainage ditches and fences on the millsite, vicinity property material stockpile maintenance, road maintance, and dust control. The original tailings piles on the millsite will not be disturbed, and no work under this HSP will be permitted to take place in established asbestos-contaminated buildings on the BLM compound.

2.0 Key Personnel Assignments

Table C–1 identifies personnel located at the Monticello field offices who provide support for millsite maintenance tasks.

Table C–1. Monticello Field Office Support Personnel

Position	Name	Telephone
Monticello Site Manager	John G. Pepin	801–587–2615
MRAP Project Manager	Thomas Myer	801–587–2615
Field Engineer	Edie Goad	801–587–2615
Construction Inspector	Joe Slade	801–587–2615
Geotech SHSC	Dave Allen	801–587–2615

3.0 Safety and Health Hazard Analysis

3.1 Task Identification

The millsite maintenance tasks listed in Table C–2 are scheduled for completion by Geotech personnel. Task priorities are contingent on evaluations of the potential for exposure to hazardous substances.

3.2 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Controls for the hazards evaluated are established in this HSP. If hazards identified at the millsite are beyond those evaluated in this HSP, the SHSC must provide additional controls immediately through an approved RPW or SWP, in accord with Geotech *Health and Safety Manual*, Volume 1, Procedures 3.11 and 2.4, respectively. Concurrent with the initiation of the SWP or RWP, the project manager must initiate an HSP page change notice (PCN) to include these additional hazards in this HSP.

Table C–2. Millsite Preparation Tasks

Task	Number	Description
Millsite Inspections	1–1	Ensure vicinity property material is stockpiled correctly
	1–2	Ensure adequate dust control
	1–3	Inspect fences and drainage ditches
Safety Inspections	2–1	Monitor health hazards
	2–2	Pest controlled areas
	2–3	Radiological release material for unrestricted use

3.3 Industrial Safety Risk Assessment

The following physical hazards are present during all tasks listed. Table C–3 lists the individual industrial safety hazards associated with single tasks at the millsite. When deemed necessary by the OH&S supervisor and/or industrial safety engineer, these hazards will be addressed, along with the appropriate control measures, in an SWP or a Job Safety Analysis (JSA). Geotech *Health and Safety Manual*, Volume 1, Procedure 2.4, should be followed during the development of the SWP, and Geotech *Health and Safety Manual*, Volume 1, Procedure 2.20, should be followed during the development of the JSA.

Temperature Extremes

Workers may be performing tasks throughout the year; consequently, they will be working during periods of both high and low ambient temperatures and are likely to be wearing PPE that may be impermeable. Heat stress will be a hazard requiring special controls.

Heavy Equipment Operations

Movement of heavy equipment at the site, possibly including dump trucks, loaders, and backhoes, will create a safety hazard.

Fires

Refueling operations can result in fires and explosions.

Portable Hand Tools

Using portable hand tools can cause potential electrical shock hazards.

Table C–3 Industrial Safety Risks
(Identify below physical hazards that are present and related specific tasks.)

Physical Hazards	Hazard Y/N?	Task No.	JSA Attached
Noise	Y	1, 2	(1)
Heat: ambient air hot process (steam) hot process (incin.)	Y N N	1, 2	(1)
Cold	N		
Rain	N		
Snow	N		
Electrical Storms	Y	1, 2	(1)
Confined Space Entry	N		
"Hot Work": welding cutting	N N		
Heavy Manual Lifting/Moving	N		
Rough Terrain	N		
Structural Integrity	N		
Remote Area	N		
Compressed Gases	N		
Diving	N		
Using Boats	N		
Working Over Water	N		
Traffic	Y	1, 2	(1)
Explosives	N		
Heavy Equipment Operation	Y	1, 2	(1)
Lift Equipment Operation: cranes manlifts	N N		
Working at Elevation: ladders scaffolding	N N		
Excavating/Trenching	N		
Materials Handling	Y	1, 2	(1)
HazMat Use/Storage: flammable liq./gas oxidizers corrosives	N N N		
Demolition	N		
Utilities: underground overhead	Y Y	1, 2 1, 2	(1) (1)
Electrical: general high voltage	Y Y	1, 2 1, 2	(1) (1)
Power Hand Tools	N		
High Pressure Water	N		

(1) See Geotech *Health and Safety Manual, Volume 1*, for means of mitigating these hazards. OH&S will carry out a pre-activity inspection on all properties to be remediated and provide JSAs where warranted.

3.4 Task by Task Hazard Analysis

The preceding sections identify the hazards known or suspected to be present during accomplishment of the tasks involved in this project.

Millsite Inspections

Inspections must ensure that vicinity property material is stockpiled correctly and dust controlled, and that terms and conditions of the subcontract are adhered to. The inspection must also monitor progress and inspect fences and drainage ditches. Hazards include

- Working around heavy equipment.
- Exposure to radioactivity.
- Inhalation and/or ingestion of radioactive materials.

Safety Inspections

Hazards are the same as for Task 1.

4.0 Selection of Personal Protective Equipment

The determination of engineering controls, administrative controls, action levels, and proper PPE must take into account the task hazard analysis performed in Section 3.3.

Engineering Controls

The subcontractor shall wet down construction areas to reduce dust inhalation.

No eating, drinking, smoking, or chewing will be permitted in controlled areas.

Action Levels for Changing Levels of Protection

Protective clothing must be prescribed in accord with radiological contamination levels.

See Table 4–1 for action to be taken when other levels are reached.

Description of PPE Level Required (Level D, in accord with Table 4–2)

The following conditions warrant the selection of this level of PPE. The discussion for recommended protection levels and the conditions that should warrant their use appears in Section 4.0:

- Low levels of radioactivity in soil.
- Airborne radioparticulates below 10% DAC.

5.0 Training Program

No variance from this HSP is required for this phase.

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

Because the tasks assigned to the millsite maintenance phase of the Monticello Mill Tailings Site are performed on a sparatic basis, sampling for airborne radioparticulates and periodic monitoring (nonradiological) will be performed at the direction of the SHSC.

8.0 Project Site Control

No variance from this HSP is required for this phase.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC shall post Table C–4, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table C–4. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237/911
Fire Department	Joe Slade	801–587–2237/911
Poison Control Center		801–587–2237 800–332–3072
Geotech Medical Representative	Shirly Calloway	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher		801–587–2237
Geotech SHSC	Dave Allen	801–587–2615
Field Engineer Construction Inspector	Eddie Goad Joe Slade	801–587–2615

11.0 Confined Space Entry

No confined space entries are required for this phase.

12.0 Spill Containment Program

No variance from this HSP is required for this phase.

Appendix D

Characterization Activities

Phase-Specific Appendix

July 1993

1.0 General Information

This phase-specific appendix has been developed to address the additional site-specific employee protection requirements necessary for the performance of detailed site characterization of the millsite.

2.0 Key Personnel Assignments

Table D–1 identifies the personnel located in Monticello who perform direct oversight activities during remedial action tasks.

3.0 Safety and Health Hazard Analysis

3.1 Task Identification

Characterization tasks planned for the millsite include the field work necessary to develop a radiologic and engineering assessment. Table D–2 lists each of the tasks necessary to complete the detailed characterization of the millsite. A general description follows of the activities performed during each task.

Initial Site Visit

Field Services—Land Survey: A land survey team will develop maps of the millsite by using normal land survey techniques according to the Geotech *Field Assessment Procedures Manual,* Chapter 23.

Health, Safety, and Security—Operational Health and Safety: Concurrent to the land survey, an OH&S technician will complete a pre-site inspection, as required by the Geotech *Health and Safety Manual,* Volume 1, Procedure 2.15. This inspection includes completing a "pre-activity inspection checklist" along with performing the "pre-entry monitoring" required by Section 7.2 of this HSP.

Radiation Protection Characterization

Health, Safety, and Security—Operational Health and Safety: An OH&S technician will perform a radiological surveillance to ensure the area postings and access controls are established according to Geotech *Health and Safety Manual,* Volume 1, Policy 3.0. This surveillance must include

- Detailed radiation dose rate surveys.
- Surface contamination surveys.
- Airborne radioactivity monitoring.

Table D–1. Geotech Personnel Assigned to the Monticello Site

Field Assessments		
Land Survey Lead	Fred N. Ruhs	303–248–6288
Responsibilities: Reports to field services manager; directs land surveyors in the performance of tasks identified. Initiates worker/supervisor medical checklists as required by section 6.0 of this HSP. Establishes appropriate site control measures for the performance of tasks identified using the guidance provided by the SHSC. Ensures that workers follow the engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
Identification Team Leaders	Mark E. Dalley Thomas R. Unrein Ernie Colunga Herman R. Lucero	6678 6751 6748 6745
Responsibilities: Reports to the identification supervisor; directs the radiological assessment team in the performance of tasks identified. Initiates the worker/supervisor medical checklists as required by section 6.0 of this HSP. Established appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
HWI Team Leaders	Tony L. Bishop Pamela Weeks	6642 6646
Responsibilities: Reports to the hazardous waste investigations supervisor; directs the hazardous waste investigation team in the performance of tasks identified. Initiates the worker/supervisor medical checklists as required by section 6.0 of this HSP. Established appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP		
Verification Team Leader	Dan L. Dow	6656 801–587–2153
Responsibilities: Reports to the verification supervisor; directs the verification team in the performance of tasks identified. Initiates the worker/supervisor medical checklists as required by section 6.0 of this HSP.		
Health, Safety and Security		
Geotech SHSC	Dave Allen	801–587–2615
Responsibilities: Reports to the OH&S supervisor. Responsible for oversight of health and safety requirements at the millsite/BLM compound. Advises Construction inspector, field services team leaders and HWI team leaders on all aspects of site health and safety requirements. Facilitates the pre-entry briefing and site-specific training. Maintains available copies of reference materials listed in this HSP including OSHA 29 CFR 1910.120, and Geotech *Environmental Procedures Manual*, and Geotech *Health and Safety Manual*, Volume 1, and Geotech *Health, Safety, and Security Desktop Procedures Manual*. Maintains documentation of employee medical surveillance as required by section 6.0 of this HSP. Performs required monitoring as listed in section 7.0 of this HSP. Assists the field services team leaders in maintaining appropriate site control measures as required by section 8.0 of this HSP. Oversees and/or performs decontamination as required by section 9.0 of this HSP.		

Table D–2. Characterization Tasks

Task		No.	Description
Initial Site Visit	Land Survey	ISV–1	Survey millsite/BLM identifying and marking boundaries
	Pre-Site Inspection	ISV–2	Complete pre-activity inspection checklist; perform pre-entry monitoring
Radiation Protection Characterization	Radiological Surveillance	RPC–1	Perform radiation does rate, surface contamination and air monitoring
Radiological Characterization	Gamma Scan	RC–1	Walking over contaminated area measuring gamma exposure rates using scintillation detector
	Utility Location	RC–2	Utility locations using Metrotech Line Tracer Model 810 or 850, or Power Line Detector, Model 50/60
	Soil Sampling	RC–3	Soil sampling using T-handled auger or a demolition hammer
	Coring and Augering	RC–4	Coring and augering using a "Little Beaver Auger Drill," "Dig-R-Mobile" trailer mounted auger, or an All Terrain Vehicle (ATV) mounted auger
Hazardous Substance Investigation	Initial Characterization	HWI–1a HWI–1b	Initial visual inspection RTA monitoring using Sensidyne FID, Colorimetric tubes, etc.
	Mobilization	HWI–2a HWI–2b HWI–2c	Establishment of control zones,boundaries Set-up equipment for sampling and personnel monitoring Set-up decontamination stations
	Sampling	HWI–3a HWI–3b HWI–3c	Sample collection using a column-type sampler Sample collection using shovel, hand or powered auger,or cutting tool Earth moving equipment to obtain sample
	Decontamination	HWI–4a HWI–4b HWI–4c	Decontamination of equipment Decontamination of PPE Removal of PPE
	Demobilization	HWI–5a HWI–5b	Dismantling of sampling equipment and decontamination stations Removal of postings and boundaries

Radiologic Characterization

Field Services—Identification: An identification team will perform radiologic characterization that includes

- Nonintrusive gamma scan surveys according to the Geotech *Field Assessment Procedures Manual*, Chapter 5.
- Underground utility location according to the Geotech *Field Assessment Procedures Manual*, Chapter 15.

- Soil sampling either with T-handled augers and square shovels or with demolition hammers according to the Geotech *Field Assessments Procedures Manual*, Chapters 16 or 14, respectively.

- Coring and augering as necessary to assess depth of contamination according to the Geotech *Field Assessments Procedures Manual*, Chapter 13.

Health, Safety, and Security—Operational Health and Safety: During the radiologic characterization, the SHSC or the OH&S technician under the direction of the SHSC will perform on-site health and safety oversight by conducting inspections for industrial safety, industrial hygiene, and health physics; performing oversight of equipment decontamination efforts; performing decontamination of personnel; releasing equipment from contaminated areas; and instructing employees on health and safety.

Hazardous Substance Investigation

Field Assessments—Hazardous Waste Investigations and Reports: When requested by the project manager, the hazardous waste investigation (HWI) team will sample and analyze materials suspected of being EPA-defined hazardous wastes or toxic substances or OSHA-defined hazardous substances. The results of this investigation will provide a recommendation for disposal options and a hazard analysis. The tasks necessary to perform this investigation are

- Initial characterization: An HWI team member will visually inspect the area to be sampled. This visual inspection will determine the basic sampling strategy to be used and the problems that may be encountered during sampling. During this task, the team member will take RTS samples by using a photoionization detector, a flame ionization detector, or colorimetric tubes. The team member will take no soil samples and disturb no soils.

- Mobilization: Mobilization involves (1) establishing work zones and the appropriate boundaries and postings, (2) setting up the sampling and monitoring equipment, and (3) setting up the decontamination stations. During this task, no samples are taken, and the soils are not disturbed.

- Sampling: Sampling tasks may consist of several different types of sampling techniques. Typically, samples will be collected with shovels, hand augers, internal-combustion engine-driven augers, and various types of liquid-collection devices. This task is confined to collecting the material in a sample jar or bottle and adding any preservatives to the sample. Sampling is performed according to the sampling and analysis plan or work plan developed specifically for the characterization work. In no case should a hazard exist after sampling has taken place. The area sampled should be restored to a safe condition.

The planned Millsite HWI characterization tasks are discussed in detail in the *Work Plan for the Millsite*. A general description follows of the activities to be performed during each task:

- Characterization of potential hazardous and radioactive wastes.

- Soil and Sediment Samples: A barrel auger will be used to penetrate surface or near-surface soil to the desired depth to obtain samples for analyses. The sampling equipment will consist of a stainless steel auger bit attached to a stainless steel rod and "T" handle. The auger bit will be used to bore a hole to the desired depth and then will be withdrawn. The barrel portion of the auger bit holds the soil cuttings and eliminates contact with the sidewall of the borehole, which minimizes the potential to spread contamination from other parts of the hole.

Table D–3. Analysis of Chemical, Biological and Radiological Hazards for Detailed Characterization Tasks

Task	No.	Description	Chemical Hazard				Biological Hazard		Radiological Hazard		
			Inhalation	Ingestion	Absorption	Skin Contact	Ingestion	Skin Contact	External	Internal	Skin Contact
Initial Site Visit	ISV–1	Survey millsite/BLM identifying and marking area boundaries	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	ISV–2	Complete pre–activity inspection checklist; perform pre-entry monitoring	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Rad Protection Characterization	RPC–1	Perform radiation does rate, surface contamination and air monitoring	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Radiological Characterization	RC–1	Walking over contaminated area measuring gamma exposure rates	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	RC–2	Utility locations using Metrotech Line Tracer or Power Line Detector	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	RC–3	Soil sampling using T-handled auger or demolition hammer	Low	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Low
	RC–4	Coring and augering using a "Little Beaver Auger Drill", a "Dig-R-Mobile" or an ATV	Low	Very Low	Low	Low	Very Low	Very Low	Very Low	Very Low	Low
Hazardous Substance Investigation	HWI–1a	Initial visual inspection	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–1b	RTA monitoring using FID/PID/OVA and Colormetric tubes, etc.	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–2a	Establishment of control zones, boundaries	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–2b	Set-up equipment for sampling and personnel monitoring	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–2c	Set-up decontamination stations	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–3a	Sample collection using a column-type sampler	Moderately Low	Low	Low	Low	Low	Low	Very Low	Low	Low
	HWI–3b	Sample collection using shovel, hand or powered auger or cutting tool	Low	Moderate	Low	Low	Low	Low	Very Low	Low	Low
Hazardous Substance Investigation	HWI–3c	Earth moving equipment to obtain sample	Low	Low	Low	Low	Low	Low	Very Low	Low	Low
	HWI–4a	Decontamination of equipment	Low	Low	Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–4b	Decontamination of PPE	Low	Low	Low	Low	Very Low	Very Low	Very Low	Low	Low
	HWI–4c	Removal of PPE	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	HWI–5a	Dismantle sampling equipment and decontamination stations	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	HWI–5b	Removal of postings and boundaries	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

With a stainless steel spoon or knife, the soil will be removed from the auger barrel and will be immediately placed into the sample containers. Care will be taken not to aerate the sample.

- Liquid Samples: To obtain samples from containerized liquids and from the decontamination rinsate, a column-type sampler such as a COLIWASA will be used to collect representative composite liquid samples. The sampler will be submerged in the liquid until the bottom of the container is reached or until a solid medium is encountered. The opening at the bottom of the sampler will then be closed (or some other method will be employed) to prevent the liquid from draining from the sampler as the sampler is withdrawn. The column-type sampler will be used to dispense liquids into sample containers, in accordance with the SAP.

  Free liquids discovered in the landfill will be sampled with a COLIWASA or a stainless steel ladle with a telescoping extension rod. If the liquid appears to be multiphased, attempts will be made to collect portions of each phase. The sample will be carefully discharged into the sample container through a stainless steel funnel. Care will be taken not to aerate the sample.

  The liquid sample containers used for organic analysis sample collection will be filled to eliminate headspace.

- Sludge Samples: Any containerized sludges found on-site will be sampled if sufficient quantities are present. Either a stainless steel spoon, knife, or ladle will be used to collect the sample. The sludge will be placed directly into the sample containers. If necessary, a stainless steel funnel will be used to assist in the transfer. Care will be taken not to aerate the sample.

  Free sludges discovered in any landfill areas will be sampled with either a barrel auger or a stainless steel or teflon ladle with a telescoping extension rod. If necessary, a funnel will be used to assist in the transfer of the sample. Care will be taken not to aerate the sample.

- Grab Samples: Selected material for sampling will be placed directly into sample containers. To the extent possible, floor tiling samples will be selected for analysis that still have a mastic (black adhesive) layer present. Any piping insulation material will be removed from the pipe for sample collection. Material suspected of containing asbestos must be sampled only by Utah-certified asbestos samplers.

- Decontamination: This task involves the decontamination of PPE and equipment used inside radiological areas (exclusion zones). Decontamination must be performed in designated "step-off pads" (decontamination corridor) contained within the boundaries of a controlled area (contamination reduction zone).

- Demobilization: Demobilization involves (1) dismantling and storing sampling and monitoring equipment, (2) dismantling decontamination stations, and (3) disestablishing work zones and removing boundaries and postings. During this task, no samples are taken, and the soils are not disturbed.

Health, Safety and Security—Operational Health and Safety: During the hazardous waste investigation, the SHSC, or OH&S technician under the direction of the SHSC, will perform on-site health and safety oversight by conducting inspections for industrial safety, industrial hygiene, and health physics concerns; performing oversight of equipment decontamination efforts and performing decontamination of personnel; releasing equipment from contaminated areas; and instructing employees

on site and health and safety concerns. All areas disturbed must be restored to a condition that will not pose a future hazard to the public, other personnel, or the environment.

3.2 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Table D–4 provides the magnitude of hazard associated with the known chemical, biological, radiological and physical hazards associated with the performance of the detailed characterization of the millsite.

Controls for the hazards evaluated are established in this HSP. When the hazards identified at the millsite are beyond those evaluated in this HSP, the SHSC shall provide additional controls required immediately by using an approved RWP or SWP, according to Geotech *Health and Safety Manual,* Volume 1, Procedures 3.11 and 2.4, respectively. Concurrent with the initiation of the RWP or SWP, the project manager shall initiate an HSP PCN to include these additional hazards in the HSP.

Industrial Safety Risk Assessment

The following hazards are present during all tasks listed. Table D–5 lists the individual safety hazards associated with single tasks at the millsite. When deemed necessary by the OH&S supervisor or the industrial safety engineer, these hazards will be addressed, along with the appropriate control measures, in an SWP or a JSA. Geotech *Health and Safety Manual,* Volume I, Procedure 2.4 should be followed during the development of the SWP, and Geotech *Health and Safety Manual,* Volume 1, Procedure 2.20 should be followed during the development of the JSA.

Temperature Extremes: Workers may be performing tasks throughout the year; consequently, they will be working during periods of both high and low ambient temperatures and are likely to be wearing PPE that may be impermeable. Heat stress will be a hazard requiring special controls and monitoring.

Heavy Equipment Operations: Movement of heavy equipment at the site, which may include dump trucks, loaders and backhoes, creates an inhalation and vision hazard.

Buried and Above-Ground Utilities: Excavation, trenching, and demolition of buildings may require locating, disconnecting, and removal of electrical, water, and natural gas utilities.

4.0 Personal Protective Equipment

During the detailed characterization tasks, any person having direct contact with soils at the time of auger/core drilling or any person performing decontamination must wear modified level D protection. Any person accessing the millsite must wear level D PPE. Detailed PPE assignments, mandatory for Geotech personnel, are listed in Table D–5. PPE may be upgraded, as necessary, on the basis of site-specific data through an RWP or SWP.

Table D–4. Industrial Safety Risk Assessment for Detailed Characterization Tasks

Task	No.	Description	Industrial Safety Hazards
Initial Site Visit	ISV–1	Survey millsite/BLM compound identifying/marking boundaries	
	ISV–2	Complete pre-activity inspection checklist; perform pre-entry monitoring	
Rad Protection Characterization	RPC–1	Perform radiation dose rate, surface contamination, air monitoring	
Radiological Characterization	RC–1	Walking over contaminated area measuring gamma exposure rates	
	RC–2	Utility locations using Metrotech Line Tracer or Power Line Detector	
	RC–3	Soil sampling using T-handled auger or demolition hammer	Hand-augering work can result in strained muscles of the upper extremities and/or neck
	RC–4	Coring/augering using a "Little Beaver Auger Drill", a "Dig-R-Mobile" or an ATV	High noise, rotating equipment; augering work can result in strained back muscles
Hazardous Substance Investigation	HWI–1a	Initial visual inspection	
	HWI–1b	RTA monitoring using PID/FID/OVA and Colormetric tubes, etc.	
	HWI–2a	Establishment of control zones, boundaries	
	HWI–2b	Set–up equipment for sampling and personnel monitoring	
	HWI–2c	Set-up decontamination stations	
	HWI–3a	Sample collection using a column type sampler	
	HWI–3b	Sample collection using shovel, hand or powered auger, or cutting tool	Hand augering work can result in strained muscles of the upper extremities and/or neck strain, high noise for powered auger
	HWI–3c	Earth moving equipment to obtain sample	High noise; rotating equipment; moving vehicles
	HWI–4a	Decontamination of equipment	High pressure water
	HWI–4b	Decontamination of personnel	
	HWI–4c	Removal of PPE	
	HWI–5a	Dismantle sampling equipment and decontamination stations	
	HWI–5b	Removal of postings and boundaries	

Table D–5 PPE Levels Assigned by Task

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
ISV–1	FA Land Survey Team						Table 4–2
ISV–2	OH&S Technician						Table 4–2
RPC–1	OH&S Technician						Table 4–2
RC–1	FA Identification Team						Table 4–2
RC–2	FA Identification Team						Table 4–2
RC–3	FA Identification Team					Table 4–3	
RC–4	FA Identification Team					Table 4–3	
HWI–1a	HWI Team Leader						Table 4–2
	HWI Technician						Table 4–2
	OH&S Technician						Table 4–2
HWI–1b	HWI Team Leader						Table 4–2
	HWI Technician						Table 4–2
	OH&S Technician						Table 4–2
HWI–2a	HWI Team Leader						Table 4–2
	HWI Technician						Table 4–2
	OH&S Technician						Table 4–2
HWI–2b	HWI Team Leader						Table 4–2
	HWI Technician						Table 4–2
	OH&S Technician						Table 4–2
HWI–2c	HWI Team Leader						Table 4–2
	HWI Technician						Table 4–2
	OH&S Technician						Table 4–2
HWI–3a	HWI Team Leader					Table 4–3	
	HWI Technician					Table 4–3	
	OH&S Technician						Table 4–2

Table D–5 (continued) PPE Levels Assigned by Task

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
HWI–3b	HWI Team Leader					Table 4–3	
	HWI Technician					Table 4–3	
	OH&S Technician						Table 4–2
HWI–3c	HWI Team Leader					Table 4–3	
	HWI Technician					Table 4–3	
	OH&S Technician						Table 4–2
HWI–3c	Equipment operator					Table 4-3	
	Laborer					Table 4-3	
	OH&S Technician						Table 4-2
HWI–4a	HWI Team Leader					Table 4–3	
	HWI Technician					Table 4–3	
	OH&S Technician						Table 4–2
HWI–4b	HWI Team leader						Table 4-2
	HWI Technician						Table 4-2
	OH&S Technician						Table 4-2
HWI–4c	HWI Team Leader						Table 4-2
	HWI Technician						Table 4-2
	OH&S Technician						Table 4-2
HWI–5a	HWI Team Leader						Table 4-2
	HWI Technician						Table 4-2
	OH&S Technician						Table 4-2
HWI–5b	HWI Team Leader						Table 4-2
	HWI Technician						Table 4-2
	OH&S Technician						Table 4-2

PPE waste generated from this phase must be segregated and dated and the activities identified. These wastes must be segregated from other site waste. These wastes must remain segregated until the samples taken during charterization are analysed, after which the PPE must be disposed of properly.

5.0 Training Program

No variance from this HSP is required for this phase.

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

When work under this phase-specific appendix is performed, sampling shall be completed in accord with Table D–6.

Table D–6. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Tissue Equivalent Survey Meter	At and within general boundary areas	Weekly
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	All personnel shall be frisked prior to release from control point boundary; all tools/ equipment surveyed prior to release from control point boundary	Prior to exiting radiological area
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area and area boundaries	Weekly
Airborne Radioparticulates	Particulate filter sample	Breathing zone of up to 50% of all workers subject to highest levels	Daily
Airborne Radioparticulates	Particulate filter	Area sample at boundary of posted airborne radioactivity area	Daily
Metals	37mm Cassette Sample (as per total dust)	Breathing zone of workers subject to highest levels	Bi-Weekly
Organic Vapors	PID/FID and Various integrated sampling methods	Breathing zone of workers subject to highest levels	Daily when there is a potential for organic vapors
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Weekly
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	High winds
Heat Stress	WBGT	Area	As needed
Cold Stress	Calibrated Thermometer	Area	As needed
Noise	Noise Dosimeter	Personnel	As needed
Noise	Noise Level Meter	Area	As needed

8.0 Project Site Control

No variance from this HSP is required for this phase.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC must post Table D–7, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table D–7. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237
Fire Department	Joe Slade	801–587–2237
Poison Control Center	N/A	801–587–2237 800–332–3072
Geotech Medical Representative	Sherry Wood	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher	N/A	801–587–2237
Geotech SHSC	Dave Allen	801–587–2615
Field Engineer Construction Inspector	Eddie Goad Mike Heronema	801–587–2615

11.0 Confined Space Entry

No variance from thnis HSP is requjired for this phase

12.0 Spill Containment Program

No variance from this HSP is required for this phase.

Appendix E

Surface and Ground Water Study

Phase-Specific Appendix

July 1993

1.0 General Information

This phase-specific appendix has been developed to address the additional site-specific employee protection requirements necessary for the surface and groundwater study.

1.1 Project Duration and Scope

The surface and ground water investigation work began in 1992 and will be ongoing until 1996. This investigation includes installation of monitoring wells upgradient and downgradient to the millsite, collection of water samples from selected surface and well sites, geologic investigations, and environment assessment. Field-sampling plans detail exact drilling and water sampling locations and types of water samples that will be collected for the investigation.

Tasks that are associated with the field work preparation and any additional monitoring (mostly surface and ground water sampling activities) are anticipated to continue until the year 2001, at which time the long-term monitoring tasks may be turned over to the Long-Term Surveillance and Maintenance Program.

2.0 Key Personnel Assignments

Table E–1 identifies personnel located in Monticello, Utah, who perform direct oversight activities during drilling activities or will perform the water sampling and water level measurement tasks.

3.0 Safety and Health Hazard Analysis

3.1 Task Identification

Well Installation and Geophysical Work

A Geotech subcontractor will complete well installation and geophysical work. During the field work, the SHSC, or OH&S technician under the direction of the SHSC, will perform on-site health and safety oversight; conduct inspections for industrial safety, industrial hygiene, and health physics concerns; perform oversight of equipment decontamination efforts; perform decontamination of personnel; release equipment from contaminated areas; and instruct employees on the site health and safety concerns.

Table E–1. Geotech Personnel Assigned to the Monticello Site

Field Assessments		
Land Survey Lead	Fred N. Ruhs	303–248–6288
Responsibilities: Reports to field Monticello Mill Tailings Site technical project manager; directs land surveyors in the performance of tasks identified. Establishes appropriate site control measures for the performance of tasks identified using the guidance provided by the SHSC. Ensures that workers follow the engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
OU III On-Site Field Supervisor	Sam E. Campbell, or designee	303–248–6654
Responsibilities: Reports to the Monticello Mill Tailings Site OU III technical project manager; directs drilling activities and/or sampling team in the performance of tasks identified in the Field Sampling Plan. Establishes appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
OU I On-Site Field Supervisor	Dave Traub	303-228-5557
Responsibilities: Reports to the Monticello Mill Tailings Site technical project manager or designee; directs drilling activities and/or sampling team in the performance of tasks identified in the Field Sampling Plan. Establishes appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
Health, Safety and Security		
Geotech Site Health and Safety Coordinator	Dave Allen	801–587–2615
Responsibilities: Reports to the OH&S supervisor. Responsible for oversight of health and safety requirements at the millsite/BLM compound. Advises on-site supervisor, team members, and drilling subcontractor on all aspects of site health and safety requirements. Facilitates pre-entry briefing and site-specific training. Maintains available copies of reference materials listed in this HSP including 29 CFR 1910.120, and Geotech *Health and Safety Manual*, Volume 1, and Geotech *Health, Safety, and Security Desktop Procedures Manual*. Maintains documentation of employee medical surveillance as required by section 6.0 of this HSP. Performs required monitoring as listed in section 7.0 of this HSP. Assists the on-site field supervisor in maintaining appropriate site control measures as required by section 8.0 of this HSP. Oversees and/or performs decontamination as required by section 9.0 of this HSP.		

Sample Collection

The sampling locations are listed in the *Field Sampling Plan*. The following sampling techniques to be used are

- Submersion of sample bottle, disposable sampler, or peristaltic pump.
- Use of bladder, peristaltic pump, bailer, or submersible pump.

3.2 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Table E–2 provides the magnitude of hazard associated with the known chemical, biological, radiological, and physical hazards associated with drilling surface and ground water wells, sampling, and measuring water levels, as well as inspecting activities at the millsite/BLM compound.

Controls for the hazards evaluated are established in this HSP. When the hazards identified at the Monticello Mill Tailings Site are beyond those evaluated in this HSP, the SHSC must immediately provide necessary additional controls by using an approved RWP or SWP, according to the Geotech *Health and Safety Manual*, Volume 1, Procedures 3.11 and 2.4, respectively. Concurrent with the initiation of the RWP or SWP, the technical project manager must initiate an HSP PCN to include these additional hazards in the HSP.

Table E–2. Hazard Assessment for Each Task

Task Number/Description	Type of Hazard	Magnitude of Hazard	
Well Installation, Augering, Coring, Piezeocone, Slug Test	Chemical	Inhalation	Low
		Absorption	Very Low
		Contact	Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Moderately Low
		Skin Contamination	Moderate
Geophysical Work- Seismic, down-hole and shallow geophysical, logging	Chemical	Inhalation	Low
		Ingestion	Moderately Low
		Absorption	Moderate
		Contact	Moderately High
	Biological Radiological	Injection	Very Low
		External Exposure	Low
		Internal Exposure	Moderately Low
		Skin Contamination	Moderate

Industrial Safety Risk Assessment

The physical hazards associated with well installation are discussed in the *Minimum Drilling Health and Safety Requirements for Operation of Small Auger, Rotary, and Core Rigs* (P–GJPO–113). This HSP must be followed during all drilling activities.

4.0 Personal Protective Equipment

During the well installation, any person having direct contact with soils or any person performing decontamination must wear modified level D protection. During sample collection, the sampler shall

wear modified level D PPE. Any person accessing the millsite must wear level D PPE. Detailed PPE assignments, mandatory for Geotech personnel, appear in Table E–3. PPE may be upgraded as necessary on the basis of site-specific data by using an RWP or SWP.

5.0 Training Program

No variance from this HSP is required for this phase.

Table E–3. PPE Levels Assigned by Task

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
Well Installation	OH&S Technician Environmental Services Technician						Table 4-2
Ground Water Sampling	Environmental Services Technician					Table 4–4	
Geophysical	OH&S Technician Environmental Serveces Technician						Table 4-2
Surface Water Sampling	Environmental Services Technician					Table 4–4	
Millsite Entry	Environmental Services Technician						Table 4-2

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

When work under this phase-specific appendix is performed, sampling must be completed in accord with Table E–4.

Table E–4. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Survey Meter	At and within general boundary areas	Weekly (during well installation)
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	All personnel shall be frisked prior to release from control point boundary; all tools/equipment surveyed prior to release from control point boundary	Prior to exiting radiological area
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area and area boundaries	Weekly (during well installation)
Airborne Radioparticulates	Particulate Filter Sample	Breathing zone of up to 50% of all workers subject to highest levels	Daily (during well installation)
Airborne Radioparticulates	Particulate Filter Sample	Area sample at boundary of posted airborne radioactivity area	Daily (during well installation)
Metals	37mm Cassette Sample (as per total dust)	Breathing zone of workers subject to highest levels	Bi-Weekly
Organic Vapors	PID/FID and Various integrated sampling methods	Breathing zone of workers subject to highest levels	When required
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Weekly
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	When visible dust is present
Heat Stress	WBGT	Area	As needed
Cold Stress	Calibrated Thermometer	Area	As needed
Noise	Noise Dosimeter	Personnel	As needed (during well installation)
Noise	Noise Meter	Area	As needed (during well installation)

8.0 Project Site Control

No variance from this HSP is required for this phase.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC must post Table E–5, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table E–5. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237/911
Fire Department	Joe Slade	801–587–2237/911
Poison Control Center	N/A	801–587–2237 800–332–3072
Geotech Medical Representative	Sherry Wood	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher	N/A	801–587–2237/911
Geotech SHSC	Dave Allen	801–587–2615
Field Engineer Construction Inspector	Eddie Goad Mike Heronema	801–587–2615

11.0 Confined Space Entry

Not applicable.

12.0 Spill Containment Program

Not applicable.

Appendix F

Millsite Preparation and Pre-Excavation

Phase-Specific Appendix

July 1993

1.0 General Information

This phase-specific appendix has been developed to address the additional site-specific employee protection requirements necessary for the performance of detailed site characterization and remedial action at the millsite.

1.1 Project Duration and Scope

The preparation of the millsite work started in 1992 and will be conducted on a seasonal schedule, generally commencing in April or May and continuing through October or November. Preparation includes the establishment of decontamination facilities and water and electrical services and construction of an interim repository. The Field Plan specifies the work that must be performed.

2.0 Key Personnel Assignments

Table F–1 identifies field personnel located in Monticello, Utah, who perform direct oversight activities during remedial action tasks.

3.0 Safety and Health Hazard Analysis

3.1 Task Identification

Site Preparation Tasks

The site preparation tasks listed in Table F–2 are scheduled to be performed by the Geotech subcontractor and are evaluated for potential employee exposure to hazardous substances. The health and safety requirements specified in this HSP are keyed to the phases of these subcontractor task performances.

3.2 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Table F–3 provides the magnitude of known chemical, biological, radiological, and physical hazards potentially associated with performance of the detailed characterization of MRAP.

Controls for the hazards evaluated are established in this HSP. When the hazards identified at the millsite are beyond those evaluated in this HSP, the SHSC must provide immediate additional controls required through an approved RWP or SWP, according to the Geotech *Health and Safety Manual*, Volume 1, Procedures 3.11 and 2.4, respectively. Concurrent with the initiation of the RWP or SWP, the project manager must initiate an HSP PCN for inclusion of these additional hazards in the HSP.

Table F–1. Geotech Personnel Assigned to the Monticello Site

Field Assessments		
Verification Team Leader	Dan Dow	801–587–2615
Responsibilities:	Reports to the field engineer; assists the field engineer in identifying the extent of contamination during remediation. Initiates the worker/supervisor medical checklists as required by section 6.0 of this HSP.	
D&D Construction Management		
Field Engineer	Eddie Goad	801–587–2615
Responsibilities:	Reports to the Monticello project manager; directs the activities of the construction inspectors in performance of tasks related to preparation of the site; responsible for oversight of subcontractor at the site. Ensure that Geotech employees perform tasks in compliance with the requirements contained in this HSP, the standard operating procedures contained in Geotech *Environmental Procedures Manual* and Geotech *Health, Safety, and Security Desktop Procedures Manual.*	
Construction Inspector	Joe Slade	801–587–2615
Responsibilities:	Reports to the field engineer. Maintains the documentation of site briefing as required in section 5.0 of this HSP. Performs "spot checks" on employee training and medical surveillance as required by sections 5.0 and 6.0 of this HSP.	
Health, Safety, and Security		
Geotech SHSC	Dave Allen	801–587–2615
Responsibilities:	Reports to the OH&S Supervisor. Responsible for oversight of health and safety requirements at the millsite/BLM. Advises the field engineer and construction inspector on all aspects of site health and safety requirements. Facilitates the pre-entry briefing and site-specific training (site briefing). Maintains available copies of reference materials listed in this HSP including OSHA 29 CFR 1910.120, Geotech *Environmental Procedures Manual* and Geotech *Health, Safety, and Security Desktop Procedures Manual.* Performs the required monitoring listed in section 7.0 of this HSP. Assists the field engineer in maintaining the appropriate site control measures as required by section 8.0 of this HSP. Oversees and/or performs decontamination as required by section 9.0 of this HSP.	

Industrial Safety Risk Assessment

The following hazards are present during all tasks listed. Table F–4 lists the individual safety hazards associated with single tasks at the millsite. When deemed necessary by the OH&S supervisor or the industrial safety engineer, these hazards must be addressed, along with the appropriate control measures, in an SWP or JSA. Geotech *Health and Safety Manual,* Volume 1, Procedure 2.4, should be followed during the development of the SWP, and Geotech *Health and Safety Manual,* Volume 1, Procedure 2.20, should be followed during the development of the JSA.

Table F–2. Millsite Preparation Tasks Schedule

Task	No.	Description
Mobilization	1–1	Establish site control zones/ boundaries
	1–2	Establish field offices w/utilities
	1–3	Set-up decontamination station
	1–4	Set-up sampling/personnel monitoring equipment
	1–5	Set-up dust control equipment
	1–6	Set-up temporary sanitation facilities
Pre-Excavation	2–1	Remove/reinstall equipment, and materials as needed for access
	2–2	Install new waterlines
	2–3	Construct asphalt roads
	2–4	Remove/Install fences
Soil Preparation/Seeding	3–1	Prepare soil for seeding
Set-Up Staging Area	4–1	Remediate contaminated soil at staging area
	4–2	Remove existing corrugated steel pipe under entrance area
	4–3	Backfill w/clean materials
	4–4	Install road base/asphalt
	4–5	Install fences/gates around area
Install Scale Facility	5–1	Remediate contaminated materials at scale pit
	5–2	Move scale into position
	5–3	Extend/install scale
Install Water Control and Service	6–1	Remediate contaminated soils for water meter pits/lines/culverts
	6–2	Construct water meter pit/lines/culverts
	6–3	Backfilling and compacting
	6–4	Install service lines, hydrants, culverts
Excavation	7–1	Remediate contaminated soils for concrete pads/roads
	7–2	Remediate contaminated soils for retention pond/culverts
	7–3	Backfilling, Compacting and Disposal for remediated areas
	7–4	Install sand blanket in pond
	7–5	Install Riprap and liner in pond
	7–6	Construct concrete pad, safety bollards, hand rails
Electric Service	8–1	Install electrical service, conduit, cable, lights, etc.
Install Crossing Culvert	9–1	Remediate contaminated soils for crossing culvert
	9–2	Place piping
	9–3	Backfill around pipe
Construct Interim Repository	10–1	Construct access road/road berm
	10–2	Prepare interim repository subgrade, ditches, berms
	10–3	Excavate retention pond, install sand blanket/HDPE liner
Decontamination	Dc.1	Decontamination of equipment
	Dc.2	Decontamination of PPE
	Dc.3	Removal of PPE
Demobilization	Dmob.1	Remove temporary utilities/sanitation stations
	Dmob.2	Remove contractor equipment after decontamination
	Dmob.3	Remove decontamination station
	Dmob.4	Remove field offices
	Dmob.5	Remove access boundaries

Table F–3. Analysis of Chemical, Biological and Radiological Hazards for Detailed Characterization Tasks

Task	No.	Description	Chemical Hazard				Biological Hazard		Radiation Hazard		
			Inhalation	Ingestion	Absorption	Skin Contract	Injection	Skin Contact	External	Internal	Skin Contact
Mobilization	1–1	Establish site control zones/boundaries	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Low	Low	Low
	1–2	Establish field office w/utilities	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	1–3	Set-up decontamination station	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	1–4	Set-up sampling/personnel monitoring equipment	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	1–5	Set-up dust control equipment	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	1–6	Set-up temporary sanitation facilities	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Pre-Excavation	2–1	Remove/reinstall equipment as needed for access	Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Low
	2–2	Install new waterline	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	2–3	Construct asphalt roads	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	2–4	Remove/Install fence	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Soil Preparation /Seeding	3–1	Prepare soil for seeding	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Set-Up Staging Area	4–1	Remediate contaminated soil at staging area	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	4–2	Remove existing CSP	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	4–3	Backfill w/clean materials	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	4–4	Install road base/asphalt	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	4–5	Install chainlink fence/gates around area	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Install Scale Facility	5–1	Remediate contaminated materials at scale pit	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	5–2	Move scale into position	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	5–3	Extend/install scale	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Table F–3 (continued). Analysis of Chemical, Biological and Radiological Hazards for Detailed Characterization Tasks

Task	No.	Description	Chemical Hazard				Biological Hazard		Radiation Hazard		
			Inhalation	Ingestion	Absorption	Skin Contract	Injection	Skin Contact	External	Internal	Skin Contact
Install Scale Facility	5–1	Remediate contaminated materials at scale pit	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	5–2	Move scale into position	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	5–3	Extend/install scale	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Install Water Control and Service	6–1	Remediate contaminated soils for water meter pits/lines/culverts	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	6–2	Construct water meter pit meter/lines/culvert	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	6–3	Backingfilling and compacting	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	6–4	Install service line/hydrants/culverts	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Excavation	7–1	Remediate contaminated soils f/concrete pad/roads	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	7–2	Remediate contaminated soils f/retention pond/culverts	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	7–3	Backingfilling, compacting, disposal for remediated areas	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	7–4	Install sand blanket in pond	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	7–5	Installriprap and liner in pond	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	7–6	Construct concrete pad, safety bollards, hand rails	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Electric Service	8–1	Install electrical service, conduit, cable, lights, etc.	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Install Culvert	9–1	Remediate contaminated soils for crossing culvert	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately low
	9–2	Place piping	Moderately Low	Very Low	Very Low	Low	Very Low	Very Low	Low	Low	Moderately Low
	9–3	Backfill around pipe	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Table F–3 (continued). Analysis of Chemical, Biological and Radiological Hazards for Detailed Characterization Tasks

Task	No.	Description	Chemical Hazard				Biological Hazard		Radiation Hazard		
			Inhalation	Ingestion	Absorption	Skin Contract	Injection	Skin Contact	External	Internal	Skin Contact
Construct Interim Repository	10–1	Construct access road/road berm	Moderately Low	Low	Very Low	Moderately Low	Very Low	Very Low	Low	Moderately Low	Moderately Low
	10–2	Prepare interim repository subgrade, ditches, berms	Moderately Low	Low	Very Low	Moderately Low	Very Low	Very Low	Low	Moderately Low	Moderately Low
	10–3	Excavate retention pond, install sand blanket and HDPE liner	Moderately Low	Low	Very Low	Moderately Low	Very Low	Very Low	Low	Moderately Low	Moderately Low
Decontamination	11–1	Decontamination of equipment	Very Low	Very Low	Very Low	Low	Very Low	Very Low	Very Low	Very Low	Low
	11–2	Decontamination of PPE	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	11–3	Removal of PPE	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
Demobilization	12–1	Remove temporary utilities/sanitation stations	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	12–2	Remove contractor equipment after decon	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low
	12–3	Remove decon station	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low	Very Low

Table F–4. Industrial Safety Risk Assessment For Millsite Preparation Tasks

Task	No.	Description	Industrial Safety Hazards
Mobilization	1–1	Establish site control zones/boundaries	Standard construction hazards
	1–2	Establish field office w/utilities	Standard construction hazards
	1–3	Set–up decontamination station	Standard construction hazards
	1–4	Set-up sampling/personnel monitoring equipment	Standard construction hazards
	1–5	Set-up dust control equipment	Standard construction hazards
	1–6	Set-up temporary sanitation facilities	Standard construction hazards
Pre-Excavation	2–1	Remove/reinstall equipment, materials as needed for access	Standard construction hazards
	2–2	Install new waterline	Standard construction hazards
	2–3	Construct asphalt roads	Traffic hazards; burn hazards
	2–4	Remove/Install fences	Cuts and bruises
Soil Preparation /Seeding	3–1	Prepare soil for seeding	Chemical splashes
Set-Up Staging Area	4–1	Remediate contaminated soil at staging area	Standard construction hazards associated w/earth work
	4–2	Remove existing CSP under entrance area	Standard construction hazards associated w/earth work
	4–3	Backfill w/clean materials	Standard construction hazards associated w/earth work
	4–4	Install road base/asphalt	Standard construction hazards associated w/earth work
	4–5	Install fence/gates around area	Standard construction hazards associated w/earth work
Install Scale Facility	5–1	Remediate contaminated materials at scale pit	Standard construction hazards associated w/earth work
	5–2	Move scale into position	Rigging hazards
	5–3	Extend/install scale	Rigging hazards
Install Water Control and Service	6–1	Remediate contaminated soils for water meter pits/lines/culverts	Standard construction hazards associated w/earth work
	6–2	Construct water meter pits/lines/culverts	Standard construction hazards
	6–3	Backfilling and compacting	Standard construction hazards
	6–4	Install service lines/hydrants/culverts	Standard construction hazards

Table F–4 (continued). Industrial Safety Risk Assessment For Millsite Preparation Tasks

Task	No.	Description	Industrial Safety Hazards
Excavation	7–1	Remediate contaminated soils f/concrete pads/roads	Standard construction hazards associated w/earth work
	7–2	Remediate contaminated soils f/retention ponds/culverts	Standard construction hazards associated w/earth work
	7–3	Backfilling, compacting, disposal for remediated areas	Standard construction hazards associated w/earth work
	7–4	Install sand blanket in pond	Standard construction hazards associated w/earth work
	7–5	Install Riprap and liner in pond	Back injuries; slips and falls
	7–6	Construct concrete pad, safety bollards, hand rails	Standard construction hazards
Electric Service	8–1	Install electrical service, conduit, cable, lights, etc.	Electrical shocks and burns
Install Culvert	9–1	Remediate contaminated soils for crossing culvert	Standard construction hazards associated w/earth work
	9–2	Place piping	Standard construction hazards
	9–3	Backfill around pipe	Standard construction hazards
Construct Interim Repository	10–1	Construct access road/road berm	Standard construction hazards
	10–2	Prepare interim repository subgrade, ditches, berms	Standard construction hazards
	10–3	Excavate retention pond, install sand blanket and HDPE liner	Standard construction hazards
Decontamination	11–1	Decontamination of equipment	High pressure water
	11–2	Decontamination of PPE	High pressure water
	11–3	Removal of PPE	Slips and falls
Demobilization	12–1	Remove temporary utilities/sanitation stations	Standard construction hazards
	12–2	Remove contractor equipment after decon	Standard construction hazards
	12-3	Remove decon station	Standard construction hazards
Working On or Near Water	13-1	Working on or near ponds	Drowning hazards
	13-2	Working on or near creek	Drowning hazards

4.0 Personal Protective Equipment

Tables F–5 through F–7 specify PPE assignments categorized by each Geotech contractor oversight task. The assignments have been made on the basis of existing information; when the SHSC identifies site conditions that vary form those evaluated in Section 3, additional PPE may be required. Any additional PPE may be prescribed by an approved RWP or SWP on the basis of specific hazard data for the work area involved.

Table F–5. Field Engineer/Construction Inspector PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
1–1	Establish site control zone/boundaries						Table 4–2
1–2	Establish field offices w/utilities						Table 4–2
1–3	Set-up decon station						Table 4–2
1–4	Set-up sampling/personnel monitoring equipment						Table 4–2
1–5	Set-up dust control equipment						Table 4–2
1–6	Set-up temporary sanitation equipment						Table 4–2
2–1	Remove/reinstall equipment,materials as needed for access						Table 4-2
2–2	Install new waterline						Table 4–2
2–3	Construct asphalt roads						Table 4–2
2–4	Remove/Install fences						Table 4–2
3–1	Prepare soil for seeding						Table 4-2
4–1	Remediate contaminated soil at staging area					Table 4–3	
4–2	Remove existing CSP					Table 4–3	
4–3	Backfill w/clean materials						Table 4–2
4–4	Install road base/asphalt						Table 4–2
4–5	Install fence/gates around area						Table 4–2
5–1	Remediate contaminated materials at scale pit					Table 4–3	
5–2	Move scale into position						Table 4–2
5–3	Extend/install scale						Table 4–2
6–1	Remediate contaminated soils f/water meter pits/lines/culverts					Table 4–3	
6–2	Construct water meter pits/lines/culverts						Table 4–2
6–3	Backfilling and compacting						Table 4–2
6–4	Install service lines/hydrants/culverts						Table 4–2
7–1	Remediate contaminated soils f/concrete pad					Table 4–3	

Table F–5 (continued). Field Engineer/Construction Inspector PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
7–2	Remediate contaminated soils f/retention pond/culverts					Table 4–3	
7–3	Backfilling,compacting,disposal for remediated areas						Table 4-2
7–4	Install sand blanket in pond						Table 4–2
7–5	Install Riprap and liner in pond						Table 4–2
7–6	Construct concrete pad, safety bollards, hand rails						Table 4–2
8–1	Install electrical service, conduit, cable, lights, etc.						Table 4–2
9–1	Remediate contaminated soils f/crossing culvert					Table 4–3	
9–2	Place piping					Table 4–3	
9–3	Backfill around pipe						Table 4-2
10–1	Construct access road/road berm						Table 4-2
10–2	Prepare interim repository subgrade, ditches, berms					Table 4–3	
10–3	Excavate retention pond; install sand blanket and HDPE liner					Table 4–3	
11–1	Decontamination of equipment					Table 4–3	
11–2	Decontamination of PPE						Table 4–2
11–3	Remove PPE						Table 4–2
12–1	Remove temporary utilities/sanitation facilities						Table 4–2
12–2	Remove contractor equipment after decon						Table 4–2
12–3	Remove decon station						Table 4–2

Table F–6. OH&S Technician PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
1–1	Establish site control zone/boundaries						Table 4–2
1–2	Establish field offices w/utilities						Table 4–2
1–3	Set-up decon station						Table 4–2
1–4	Set-up sampling/personnel monitoring equipment						Table 4–2
1–5	Set-up dust control equipment						Table 4–2
1–6	Set-up temporary sanitation equipment						Table 4–2
2–1	Remove/reinstall equipment,material for access					Table 4–3	
2–2	Install waterline						Table 4–2
2–3	Construct asphalt road						Table 4–2
2–4	Remove/Install fences						Table 4–2
3–1	Prepare soil for seeding						Table 4-2
4–1	Remediate contaminated soil at staging area					Table 4–3	
4–2	Remove existing CSP					Table 4–3	
4–3	Backfill w/clean materials						Table 4–2
4–4	Install road base/asphalt						Table 4–2
4–5	Install fence/gates around area						Table 4–2
5–1	Remediate contaminated materials at scale pit					Table 4–3	
5–2	Move scale into position						Table 4–2
5–3	Extend/install scale						Table 4–2
6–1	Remediate contaminated soils f/water meter pits/lines/culverts					Table 4–3	
6–2	Construct water meter pits/lines/culverts						Table 4–2
6–3	Backfilling and compacting						Table 4–2
6–4	Install service line, hydrants,culverts						Table 4–2
7–1	Remediate contaminated soils f/concrete pad/road					Table 4–3	
7–2	Remediate contaminated soils f/ pond/culverts					Table 4–3	
7–3	Backfilling,compacting,disposal remedciated areas						Table 4–2
7–4	Install sand blanket in pond						Table 4–2
7–5	Install Riprap, and liner in pond						Table 4–2
7–6	Construct concrete pad, safety bollards, hand rails						Table 4–2
8–1	Install electrical service, conduit, cable, lights, etc.					Table 4–3	

Table F–6 (continued). OH&S Technician PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
9–1	Remediate contaminated soils f/crossing culvert					Table 4–3	
9–2	Place piping						Table 4–2
9–3	Backfill around pipe						Table 4–2
10–1	Construct access road/road berm					Table 4–3	
10–2	Prepare interim repository subgrade, ditches, berms					Table 4–3	
10–3	Excavate retention pond; install sand blanket and HDPE liner					Table 4–3	
11–1	Decontamination of equipment					Table 4–3	
11–2	Decontamination of PPE						Table 4–2
11–3	Remove PPE						Table 4–2
12–1	Remove temporary utilities/sanitation facilities						Table 4–2
12–2	Remove contractor equipment after decon						Table 4–2
12–3	Remove decon station						Table 4–2

Table F–7. Field Assessments Verification Technician PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
1–1	Establish site control zone/boundaries						Table 4–2
1–2	Establish field offices w/utilities						Table 4–2
1–3	Set-up decon station						Table 4–2
1–4	Set-up sampling/personnel monitoring equipment						Table 4–2
1–5	Set-up dust control equipment						Table 4–2
1–6	Set-up temporary sanitation equipment						Table 4–2
2–1	Remove/reinstall equipment, material for access						Table 4–2
2–2	Install waterline						Table 4–2
2–3	Construct asphalt roads						Table 4–2
2–4	Remove/Install fences						Table 4–2
3–1	Prepare soil for seeding						Table 4-2
4–1	Remediate contaminated soil at staging area					Table 4–3	
4–2	Remove existing CSP					Table 4–3	
4–3	Backfill w/clean materials						Table 4–2
4–4	Install road base/asphalt						Table 4–2

Table F–7 (continued). Field Assessments Verification Technician PPE Assignments

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
5–1	Remediate contaminated materials at scale pit					Table 4–3	
5–2	Move scale into position						Table 4–2
5–3	Extend/install scale						Table 4–2
6–1	Remediate contaminated soils f/water meter pits/lines/culverts					Table 4–3	
6–2	Construct water meter pits/lines/culverts						Table 4–2
6–3	Backfilling and compacting						Table 4–2
6–4	Install service lines/hydrants/culverts						Table 4–2
7–1	Remediate contaminated soils f/concrete pad					Table 4–3	
7–2	Remediate contaminated soils f/retention pond/culverts					Table 4–3	
7–3	Backfilling,compacting,disposal for remediated areas						Table 4–2
7–4	Install sand blanket in pond						Table 4–2
7–5	Install Riprap and liner in pond						Table 4–2
7–6	Construct concrete pad, safety bollards, hand rails						Table 4–2
8–1	Install electrical service, conduit, cable, lights, etc.						Table 4–2
9–1	Remediate contaminated soils f/crossing culvert					Table 4–3	
9–2	Place Piping					Table 4–3	
9–3	Backfill around pipe						Table 4–2
10–1	Construct access road/road berm					Table 4–3	
10–2	Prepare interim repository subgrade, ditches, berms					Table 4–3	
10–3	Excavate retention pond; install sand blanket and HDPE liner					Table 4–3	
11–1	Decontamination of equipment					Table 4–3	
11–2	Decontamination of PPE						Table 4–2
11–3	Remove PPE						Table 4–2
12–1	Remove temporary utilities/sanitation facilities						Table 4–2
12–2	Remove contractor equipment after decon						Table 4–2
12–3	Remove deconstation						Table 4–2

5.0 Training Program

No variance from this HSP is required for this phase.

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

When work under this phase-specific appendix is performed, sampling must be completed in accord with Table F–8.

Table F–8. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Tissue Equivalent Survey Meter	At and within general boundary areas	Weekly
Radiological Surface Contamination	α sensative count rate meter -and- β sensative count rate meter	All personnel shall be frisked prior to release from control point boundary; all tools/equipment surveyed prior to release from control point boundary	Prior to exiting radiological area
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area and area boundaries	Weekly
Airborne Radioparticulates	Particulate filter sample	Breathing zone of up to 50% of all workers subject to highest levels	Daily
Airborne Radioparticulates	Particulate filter sample	Area sample at boundary of posted airborne radioactivity area	Daily
Metals	37mm Cassette Sample	Breathing zone of workers subject to highest levels	Bi-weekly
Organic Vapors	PID/FID and various integrated sampling methods	Breathing zone of workers subject to highest levels	When required
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Weekly
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	When visible dust is present
Heat Stress	WBGT	Area	As needed
Cold Stress	Calibrated Thermometer	Area	As needed
Noise	Noise Dosimeter	Personnel	As needed
Noise	Noise Meter	Area	As needed

8.0 Project Site Control

The only variance required from this HSP appears in Section 8.5, "Safe Work Practices."

Working on or near water requires personnel to be protected from drowning hazards by U.S. Coast Guard-approved personal floatation devices or buoyant work vests. These devices must be inspected before and after use for defects. Defective units must not be used. Ring buoys with at least 90 feet of line must be provided for emergency rescue. The ring buoys must not be spaced more than 200 feet apart. One lifesaving skiff must be available where employees are working over or are adjacent to water.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC shall post Table F–9, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table F–9. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237/911
Fire Department	Joe Slade	801–587–2237/911
Poison Control Center		801–587–2237 800–332–3072
Geotech Medical Representative	Sherry Wood	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher		801–587–2237/911
Geotech SHSC	Dave Allen	801–587–2153
Field Engineer Construction Inspector	Eddie Goad Mike Heronema	801–587–2615

11.0 Confined Space Entry

No variance from this HSP is required for this phase.

12.0 Spill Containment Program

No variance from this HSP is required for this phase.

Appendix G

Well Installation and Abandonment

Phase-Specific Appendix

July 1993

1.0 General Information

This phase-specific appendix has been developed to address the additional site-specific employee protection requirements necessary for the installation and abandonment of monitoring wells, coreholes, and drillholes.

1.1 Project Duration and Scope

The well-installation and well-abandonment activities began in 1992 and will be ongoing until 1996. These activities include installation and abandonment of monitoring wells, coreholes, and drillholes on the millsite area, on tailing piles, on former BLM compounds, and upgradient and downgradient to the millsite (upgradient wells are outside the scope of this HSP). As each well-installation or well-abandonment project is developed, a Statement of Work will be prepared that details site-specific procedures and locations.

Tasks that are associated with well-abandonment activities involve constructing containment pit(s) to impound generated fluids and sediments, mechanical removing of well pad and cover, removing sediments from the monitoring wells, removing surface casing, purging of any residual water, water sampling (if applicable), drilling out of polyvinyl chloride (PVC) casing and screen, closing of the hole with grout, placing cement plug(s), final closing of the hole with native material, and restorating drillsites. In the event that the surface casing can not be removed, it will be perforated and cut off below ground surface and abandoned as stated above.

2.0 Key Personnel Assignments

Table G–1 identifies personnel located in Monticello, Utah, who perform direct oversight activities during well-installation and well-abandonment activities.

3.0 Safety and Health Hazard Analysis

3.1 Task Identification

Table G–2 identifies tasks associated with well-installation and well-abandonment activities.

Well Installation and Abandonment

Well installation and abandonment will be completed by a Geotech subcontractor who must conform to the Statement of Work. During the completion of work, the SHSC or designee will perform on-site health and safety oversight, conduct inspections for industrial safety, industrial hygiene, and health physics concerns, perform oversight of equipment decontamination efforts, perform decontamination of personnel, release equipment from contaminated areas, and instruct employees on the site health and safety concerns.

Excavation and Restoration of Containment Pits

Containment pits may be constructed by a Geotech subcontractor to impound fluids and sediment generated from well-installation and well-abandonment activities. After completion of well-installation

or well-abandonment, the pits must be restored to the original surface condition. On-site health and safety oversight will be conducted in the same manner as described above in the well-installation and well-abandonment tasks.

Sample Collection

If required by the well abandonment project, water samples are to be collected prior to abandonment through sampling techniques specified in the *OU III Field Sampling Plan.*

Table G–1. Geotech Personnel Assigned to the Monticello Site

Environment Services or Monticello Engineering Geotech Technical Monitor	To be determined for each project.	NA
Responsibilities: Reports to Monticello Mill Tailings Site technical project manager; directs well abandonment activities and/or sampling team in the performance of tasks identified. Establishes appropriate site control measures for the performance of tasks identified using the guidance provided by the SHSC. Ensures that workers follow the engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
Field Assessments Geotech Drilling Coordinator	Jack L. McCaslin	303–248–6165
Responsibilities: Reports to the Monticello Mill Tailings Site technical project manager; provides technical oversight to well abandonment activities in the performance of tasks identified. Establishes appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
Health, Safety and Security Geotech Site Health and Safety Coordinator	Dave Allen	801–587–2615
Responsibilities: Reports to the OH&S supervisor. Responsible for oversight of health and safety requirements at the millsite/BLM compound. Advises on-site supervisor, team members, and drilling subcontractor on all aspects of site health and safety requirements. Facilitates pre-entry briefing and site-specific training. Maintains available copies of reference materials listed in this HSP including 29 CFR 1910.120, and Geotech *Health and Safety Manual, Volume 1,* and Geotech *Health, Safety, and Security Desktop Procedures Manual* (section 6.0 of this HSP). Maintains documentation of employee medical surveillance. Performs required monitoring as listed in section 7.0 of this HSP. Assists the on-site field supervisor in maintaining appropriate site control measures as required by section 8.0 of this HSP. Oversees and/or performs decontamination as required by section 9.0 of this HSP.		

Table G-2. Task Identification of Well-Installation and Well-Abandonment Activities

Task	Description
1	**MOBILIZATION** a. Set up drill rig over well. b. Establishment of site control zones and erection of boundaries. c. Set up sampling equipment, personnel monitoring equipment.
2	**INSTALLATION OF MONITORING WELLS** a. Rotary or auger drill rig setup and drilling. b. Set casing and cement. c. Packer testing.
3	**ABANDONMENT OF MONITORING WELLS** a. Rotary or auger drill sediment out of the well, through the well casing. b. Purge well, then water sample (if applicable). c. Drill out PVC casing. d. Grout well closed to within 5 feet of final excavation surface or ground level. e. If well has a surface casing, grout well closed to 10 ft above the bottom of the casing seat. 1. Drill out PVC casing or 2. Remove steel surface casing by welding grab or lift hooks onto casing. 3. Lift casing with rig or jacks. 4. Cut off casing sections when raised. . 5. If unable to remove steel casing, use a perforator tool to punch holes in the casing, then cut off casing below ground level with a torch. f. Pressure inject grout into hole/casing to within 5 feet of final excavation surface or ground level. g. Cement hole to within 2 feet of ground level. h. Fill remaining hole with native soil.
4	**ABANDONMENT OF COREHOLES AND/OR DRILLHOLES** a. Rotary or auger drill sediment out of the corehole/drillhole through the well casing. b. Grout well closed to 10 ft above the bottom of the surface casing. c. Drill out PVC casing. . d. If corehole has a surface casing, follow step e above. e. Grout hole to within 5 feet of surface. f. Cement hole to within 2 feet of surface. g. Fill remaining hole with native soil.
5	**EXCAVATION/RESTORATION OF CONTAINMENT PITS** a. Construct a pit to contain sediment residue and purge water from well abandonment. b. Line pit with 10 ml plastic, fence, and post signs. c. Excessive water will be pumped out of pits and transported to evaporation/retention pits on the millsite. d. At the conclusion of abandonment activities the pits will be restored. e. Fill in pits with excavated soils. f. Recontour site and reseed (if applicable).
6	**STOCKPILE WELL MATERIALS** a. Contaminated well casings, protective covers, and cement debris removed from abandoned wells will be placed at the East tailing pile area for future remediation.
7	**DEMOBILIZATION** a. Break down zones. b. Decontaminate equipment and perform a release frisk. c. Frisk out personnel.

3.2 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Table G–3 provides the magnitude of hazard associated with the known chemical, biological, radiological, and physical hazards associated with well installation and abandonment.

Controls for the hazards evaluated are established in this HSP. When the hazards identified at the Monticello Mill Tailings Site are beyond those evaluated in this HSP, the SHSC shall provide necessary additional controls immediately by completing an approved RWP or SWP, according to Geotech *Health and Safety Manual*, Volume 1, Procedures 3.11 and 2.4, respectively. Concurrent with the initiation of the RWP or SWP, the technical project manager must initiate an HSP PCN to include these additional hazards in the HSP.

Industrial Safety Risk Assessment

The physical hazards associated with well installation and abandonment are covered in the *Minimum Drilling Health and Safety Requirements for Operation of Small Auger, Rotary, and Core Rigs* (P–GJPO–113) and are listed in Table G-4. This HSP must be followed during all drilling activities for each project.

If water sampling of a well is required before abandonment, the physical hazards for the sample collection tasks are addressed in the individual procedures in the *OU III Field Sampling Plan* or in the Geotech *Environmental Procedures Catalog*.

4.0 Personal Protective Equipment

During the well-installation and well-abandonment activities, any person having direct contact with soils or any person performing decontamination must wear modified level D protection. During water sample collection, the sampler shall wear modified level D PPE. Any person accessing the millsite must wear level D PPE. Detailed PPE assignments, mandatory for Geotech personnel, are listed in Table G-5 below. PPE may be upgraded as necessary on the basis of site-specific data with an RWP or SWP.

5.0 Training Program

No variance from this HSP is required for this phase.

Table G–3. Hazard Assessment for Each Task

Task Number/Description	Type of Hazard	Magnitude of Hazard	
1. Mobilization	Chemical	Inhalation	Very Low
		Absorption	Very Low
		Contact	Very Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low
		Skin Contamination	Low
	Physical	Moderate lifting hazard and low noise hazard	
2. Installation and Abandonment of Monitoring Wells, Coreholes, and Drillholes	Chemical	Inhalation	Low
		Ingestion	Low
		Absorption	Low
		Contact	Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low to moderate
		Skin Contamination	Very Low
	Physical	High noise, heavy equipment, and high pressure hazards. HOT WORK. Moderate lifting hazard.	
3. Excavation/Restoration of Containment Pits	Chemical	Inhalation	Low
		Absorption	Low
		Contact	Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low to Moderate
		Skin Contamination	Low
	Physical	Heavy equipment hazards. Moderate noise hazards.	
4. Stockpile of Well Materials	Chemical	Inhalation	Low
		Absorption	Low
		Contact	Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low to Moderate
		Skin Contamination	Low
	Physical	Heavy equipment hazards. Moderate noise hazards.	

Table G-3 (continued). Hazard Assessment for Each Task

Task Number/Description	Type of Hazard	Magnitude of Hazard	
5. Demobilization	Chemical	Inhalation	Very Low
		Absorption	Very Low
		Contact	Very Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low
		Skin Contamination	Low
	Physical	Moderate lifting hazard and low noise hazard. Heavy equipment hazards.	

Table G-4. Physical Hazard Identification

Description	Task No.
Noise	2-3
Rain	1-5
Electrical Storms	1-5
"Hot Work"—Welding	2
"Hot Work"—Cutting	2
Heavy Manual Lifting and Moving	1-5
Rough Terrain	1-5
Compressed Gases	2
Heavy Equipment Operations	1-5
Lifting Equipment Operations—Cranes	2
Excavation and Trenching	3
Materials Handling	1-5
Utilities—Overhead	1-5
High Pressure Water	2

Table G-5. PPE Levels Assigned by Task

Mobilization/Demobilization		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
Well Installation	OH&S Technician Environmental Services or Monticello Engineering Personnel Drilling Coordinator Geologist					Table 4-4	
Well Abandonment	OH&S Technician Environmental Services or Monticello Engineering Personnel Drilling Coordinator						Table 4-2
Excavation/ Restoration of Containment Pits	Environmental Services or Monticello Engineering Personnel Drilling Coordinator						Table 4-2
Stockpile well materials	OH&S Technician Environmental Services or Monticello Engineering Personnel Drilling Coordinator						Table 4-2
Ground Water Sampling	Environmental Services Technician					Table 4-4	
Millsite Entry	OH&S Technician Environmental Services or Monticello Engineering Personnel Drilling Coordinator						Table 4-2

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

When work under this phase-specific appendix is performed, installation and abandonment activities must be completed in accord with Table G-6.

Table G-6. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Survey Meter	At and within general boundary areas	Weekly (during well abandonment activities)
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	All personnel shall be frisked prior to release from control point boundary; all tools/equipment surveyed prior to release from control point boundary	Prior to exiting radiological area
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area and area boundaries	Weekly (during well abandonment activities)
Airborne Radioparticulates	Particulate Filter Sample	Breathing zone of up to 50% of all workers subject to highest levels	Daily (during well abandonment activities)
Airborne Radioparticulates	Particulate Filter Sample	Area sample at boundary of posted airborne radioactivity area	Daily (during well abandonment activities)
Metals	37mm Cassette Sample (as per total dust)	Breathing zone of workers subject to highest levels	Bi-Weekly (during well abandonment activities)
Organic Vapors	PID/FID and Various integrated sampling methods	Breathing zone of workers subject to highest levels	When required
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Weekly (during well abandonment activities)
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	Initially and periodically
Heat Stress	WBGT	Area	As needed
Cold Stress	Calibrated Thermometer	Area	As needed
Noise	Noise Dosimeter	Personnel	As needed (during well abandonment activities)
Noise	Noise Meter	Area	As needed (during well abandonment activities)

8.0 Project Site Control

No variance from this HSP is required for this phase, except that a map of the project site must be posted at each control point to the well-installation or well-abandonment site(s) upgradient and downgradient to the millsite. This site map must indicate the locations of first aid stations, evacuation routes, fire control equipment, and communications equipment.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC must post Table G-7, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table G-7. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237/911
Fire Department	Joe Slade	801–587–2237/911
Poison Control Center	N/A	801–587–2237 800–332–3072
Geotech Medical Representative	Sherry Wood	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher	N/A	801–587–2237/911
Geotech SHSC	Dave Allen	801–587–2615
Field Engineer Construction Inspector	Eddie Goad Mike Heronema	801–587–2615

11.0 Confined Space Entry

Not applicable.

12.0 Spill Containment Program

Not applicable.

Appendix H

Chemical Barriers Feasibility and Field Demonstration

Phase-Specific Appendix

July 1993

1.0 General Information

This phase-specific appendix has been developed to address the additional site-specific employee protection requirements necessary for the Chemical Barriers Feasibility and Field Demonstration, (CBFFD) Technical Task Plan No. AL931002.

1.1 Project Duration and Scope

The CBFFD will begin in June 1993 and continue until completed. The investigation objectives are

1. To determine the feasibility of forming an amorphous ferric oxyhydride ($FE(OH)_3$) (AFO) chemical barrier by injection.

2. To design and test a low-cost field demonstration of a chemical barrier.

3. To demonstrate the performance of an AFO-based chemical barrier to control radionuclide and metal contamination in a groundwater plume.

This investigation includes (1) installing injection wells, (2) installing monitoring wells upgradient and downgradient to the millsite, (3) injecting radionuclide tracers, ferric chloride, and contaminated ground water, (4) collecting water samples from selected surface and well sites, (5) investigating the geology, and (6) assessing the environment. The field plan specifies drilling and water sampling locations and types of water samples to be collected for the investigation.

2.0 Key Personnel Assignments

Table H–1 identifies personnel located in Monticello, Utah, who perform direct oversight activities during drilling activities or who perform the water sampling and water level measurement tasks.

3.0 Safety and Health Hazard Analysis

3.1 Chemical Hazard Identification

Ferric Chloride **Permissible Exposure Limit 1 mg/m^3**

Ferric chloride is a skin, eye, and respiratory irritant.

3.2 Radiological Hazard Identification

Radioactive material used as tracers is the focus of this work. Table H-2 lists these isotopes, along with the decay mode and derived air concentration (DAC) limits. The Manager, Operational Health and Safety (OH&S), will authorize the use of a default DAC only after calculation approval by the Radiological Controls Manager.

Table H–1. Geotech Personnel Assigned to the Monticello Site

Field Assessments		
Land Survey Lead	Fred N. Ruhs	303–248–6288
Responsibilities: Reports to field Monticello Mill Tailings Site technical project manager; directs land surveyors in the performance of tasks identified. Establishes appropriate site control measures for the performance of tasks identified using the guidance provided by the SHSC. Ensures that workers follow the engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
On-Site Field Supervisor	Sam E. Campbell, or designee	303–248–6654
Responsibilities: Reports to the Monticello Mill Tailings Site OU III technical project manager; directs drilling activities and/or sampling team in the performance of tasks identified. Establishes appropriate site control measures for the performance of tasks identified using guidance provided by the SHSC. Ensures that workers follow engineering controls and PPE requirements assigned in section 4.0 of this HSP.		
Health, Safety and Security		
Geotech Site Health and Safety Coordinator	Dave Allen	801–587–2615
Responsibilities: Reports to the OH&S supervisor. Responsible for oversight of health and safety requirements at the millsite/BLM compound. Advises on-site supervisor, team members, and drilling subcontractor on all aspects of site health and safety requirements. Facilitates pre-entry briefing and site-specific training. Maintains available copies of reference materials listed in this HSP including 29 CFR 1910.120, and Geotech *Health and Safety Manual, Volume 1,* and Geotech *Health, Safety, and Security Desktop Procedures Manual.* Maintains documentation of employee medical surveillance as required by section 6.0 of this HSP. Performs required monitoring as listed in section 7.0 of this HSP. Assists the on-site field supervisor in maintaining appropriate site control measures as required by section 8.0 of this HSP. Oversees and/or performs decontamination as required by section 9.0 of this HSP.		

Table H–2. Typical Radioisotope Contamination

Element or Isotope	Decay Type	Derived Air Concentration[a]
Uranium-236	α,β,γ	$6X10^{-10}$ μCi·mL^{-1} (22 Bq/m^3)
Iron-59	β,γ	$1x10^{-07}$ μCi·mL^{-1} (33,330 Bq/m^3)
Hydrogen-3	β	$2x10^{-05}$ μCi·mL^{-1} ($7.1x10^5$ Bq/m^3)

[a] Derived air concentration listed in DOE Order 5480.11.

[b] These values are appropriate for protection from radon combined with its short-lived daughters and are based upon International Council on Radiation Protection (ICRP) Publication 32 (EPA 520/1–88–020).

3.3 Task Identification

Task identifications are also listed in Appendices D, E, F, and G.

Well Installation

A Geotech subcontractor will complete well installations. During the field work, the SHSC (or OH&S technician under the direction of the SHSC) will perform on-site health and safety oversight; conduct inspections for industrial safety, industrial hygiene, and health physics concerns; perform oversight of equipment decontamination efforts; perform decontamination of personnel; release equipment from contaminated areas; and instruct employees on site health and safety concerns.

Mixing Radionuclide Tracers and Ferric Chloride Solution

Subcontractor personnel will mix 30,000 pCi/L of Iron-59 (^{59}Fe) as $FeCl_3$, 160,000 pCi/L of Hydrogen-3 (^{3}H) , and 600 pCi/L of Uranium-236 (^{236}U) with clean water and contaminated ground water. The mixing will occur in line through metering pumps.

Injection of Mixed Solution

The solutions will be injected into the ground water.

3.4 Hazard Analysis

Chemical, Biological, and Radiological Hazards Analysis

Table H–3 specifies the magnitude of hazard associated with the known chemical, biological, radiological, and physical hazards associated with the process of mixing and injecting the ferric chloride and ^{59}Fe, ^{3}H, ^{236}U tracers.

Controls for the hazards evaluated are established in this HSP. When the hazards identified at the Monticello Mill Tailings Site are beyond those evaluated in this HSP, the SHSC shall provide the additional controls required immediately by using an approved RWP or SWP, according to Geotech *Health and Safety Manual*, Volume 1, Procedures 3.11 and 2.4. Concurrent with the initiation of the RWP or SWP, the technical project manager shall initiate a HSP PCN to include these additional hazards in the HSP.

Industrial Safety Risk Assessment

The physical hazards associated with well installation are covered in the *Minimum Drilling Health and Safety Requirements for Operation of Small Auger, Rotary, and Core Rigs* (P–GJPO–113). This HSP must be followed during all drilling activities.

Table H–3. Hazard Assessment for Each Task

Task Number/Description	Type of Hazard	Magnitude of Hazard	
Mixing Solution	Chemical	Inhalation	Low
		Absorption	Very Low
		Contact	Low
	Biological	Injection	Very Low
	Radiological	External Exposure	Low
		Internal Exposure	Low
		Skin Contamination	Low
Injection of Solution and Sampling	Chemical	Inhalation	Low
		Ingestion	Low
		Absorption	Low
		Contact	Low
	Biological Radiological	Injection	Very Low
		External Exposure	Low
		Internal Exposure	Low
		Skin Contamination	Low

4.0 Personal Protective Equipment

During the well installation, any person having direct contact with soils and any person performing decontamination must wear modified level D protection. During sample collection, the sampler must wear modified level D PPE. Any person entering the millsite must wear level D PPE. Detailed PPE assignments, mandatory for Geotech personnel, appear in Table H–4. PPE may be upgraded as necessary on the basis of site-specific data through an RWP or SWP.

5.0 Training Program

No variance from this HSP is required for this phase.

6.0 Medical Surveillance Program

No variance from this HSP is required for this phase.

7.0 Exposure Monitoring

When work under this phase-specific appendix is performed, sampling must be completed in accord with Table H–5.

Table H–4 PPE Levels Assigned by Task

Task		Level of Protection					
		A	B	Mod-C	C	Mod-D	D
Mixing Solution	H&S Technician Environmental Services Technician						Table 4-2
Solution Injection	HH&S Technician Environmental Services Technician						Table 4-2
Injection Solution Sampling	Geotech Personnel						Table 4-2 plus nitrile gloves*

*Nitrile gloves must be changed every 30 minutes.

Table H–5. Monitoring Requirements

Type of Monitoring	Method of Monitoring	Location of Monitoring	Frequency of Sampling
Radiation Dose Rate	Survey Meter	At and within general boundary areas	Weekly (during well installation)
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	All personnel shall be frisked prior to release from control point boundary; all tools/equipment surveyed prior to release from control point boundary	Prior to exiting radiological area
Radiological Surface Contamination	α sensitive count rate meter -and- β sensitive count rate meter	Work area and area boundaries	Weekly (during well installation)
Airborne Radioparticulates	Particulate Filter Sample	Breathing zone of up to 50% of all workers subject to highest levels	Daily (during well installation)
Airborne Radioparticulates	Particulate Filter Sample	Area sample at boundary of posted airborne radioactivity area	Daily (during well installation)
Metals	37mm Cassette Sample (as per total dust)	Breathing zone of workers subject to highest levels	Bi-Weekly
Organic Vapors	PID/FID and Various integrated sampling methods	Breathing zone of workers subject to highest levels	When required
Respirable Dust	10mm Cyclone	Breathing zone of workers subject to highest levels	Weekly
Respirable Dust	Miniram	Air sampling representative of breathing zone of workers subject to highest levels	Initially and periodically
Heat Stress	WBGT	Area	As needed
Cold Stress	Calibrated Thermometer	Area	As needed
Noise	Noise Dosimeter	Personnel	As needed (during well installation)
Noise	Noise Meter	Area	As needed (during well installation)

8.0 Project Site Control

No variance from this HSP is required for this phase.

9.0 Decontamination

No variance from this HSP is required for this phase.

10.0 Emergency Response Plan

The SHSC shall post Table E–6, "Emergency Contacts and Telephone Numbers," in a conspicuous location at the project site.

Table H–6. Emergency Contacts and Telephone Numbers

Key Person/Agency	Contact Name	Contact Phone No.
EMT/Ambulance	Paul Sondregger	801–587–2237/911
Fire Department	Joe Slade	801–587–2237/911
Poison Control Center	N/A	801–587–2237 800–332–3072
Geotech Medical Representative	Sherry Wood	303–248–6080
San Juan Hospital	Dr. S. Warren	801–587–2237
Sheriff's Dispatcher	N/A	801–587–2237/911
Geotech SHSC	Dave Allen	801–587–2615
Field Engineer Construction Inspector	Eddie Goad Mike Heronema	801–587–2615

11.0 Confined Space Entry

No variance from this HSP is required for this phase.

12.0 Spill Containment Program

No variance from this HSP is required for this phase.